2012 Annual Report

Jeremiah W. (Jay) Nixon, Governor

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Missouri Department of Health and Senior Services

Acknowledgements

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Communicable Disease Surveillance 2012 Annual Report

Note: This report does not include a summary of sexually transmitted diseases, Hepatitis, HIV, or environmental conditions.

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Missouri Profile

Missouri is 69,697 square miles and slightly more than half of the population live in or near the two major cities, St. Louis, Kansas City. Missouri became a state in 1821 and has 114 counties. Jefferson City is the capital. The major flows of traffic within the state are from the east to west along the Missouri valley and southward along the Mississippi.

Missouri is geographically diverse, with tilled plains in the north, Ozark Mountains in the south and the presence of the Mississippi Alluvial Plain in the southeast part of the state.

Missouri's economy is also highly diversified. While wholesale, retail trade, manufacturing, and agriculture play significant roles in the state's economy, service industries provide more income and jobs than any other segment, and include a growing tourism and travel sector. Missouri is a leading producer of transportation equipment (including automobile manufacturing and auto parts), beer and beverages, and defense and aerospace technology. Food processing is the state's fastest-growing industry. Missouri mines produce 90% of the nation's principal (non-recycled) lead supply. Other natural resources include iron ore, zinc, barite, limestone, and timber. The state's top agricultural products include grain, sorghum, hay, corn, soybeans, and rice. Missouri also ranks high among the states in cattle and calves, hogs, turkeys and broilers. A vibrant wine industry also contributes to the economy.

Population (2012)*	**6,021,988**	**Percent of Total Population**
Urban	74.5%	(Based on 2012 census)
Rural	25.5%	(Based on 2012 census)

Sex	**Population**	
Male	2,951,036	49.0%
Female	3,070,952	51.0%

Age Group	**Population**	
<1	75,400	1.3%
1-4	303,846	5.0%
5-14	785,738	13.0%
15-24	832,017	13.8%
25-39	1,143,263	19.0%
40-64	1,998,543	33.2%
65 and older	883,181	14.7%

Live Births	75,400
Deaths	55,783

Race	**Population**	**Percent of Total Population**
White	5,112,671	84.9%
Black	743,926	12.4%
Other	165,391	2.7%

District	**Population**	
Central	670,268	11.1%
Eastern	2,241,339	37.2%
Northwest	1,578,727	26.2%
Southeast	474,824	7.9%
Southwest	1,056,830	17.5%

Leading Causes of Death:**	**Number of Deaths Reported**	**Percent of Total Deaths Reported**
Heart disease	13,609	24.4%
Malignant Neoplasms	12,831	23.0%
Chronic lower respiratory disease	3,642	6.5%
Unintentional injuries	3,012	5.4%
Cerebrovascular disease (stroke)	2,950	5.3%
Alzeheimer's disease	1,854	3.3%
Diabetes Mellitus	1,371	2.5%

*Unless otherwised noted, all percentages are based on 2010 population estimates.

**Not all causes of death are listed.

Data Provided by: Public Health Practice & Administrative Support Section, Bureau of Health Informatics, Department of Health and Senior Services.

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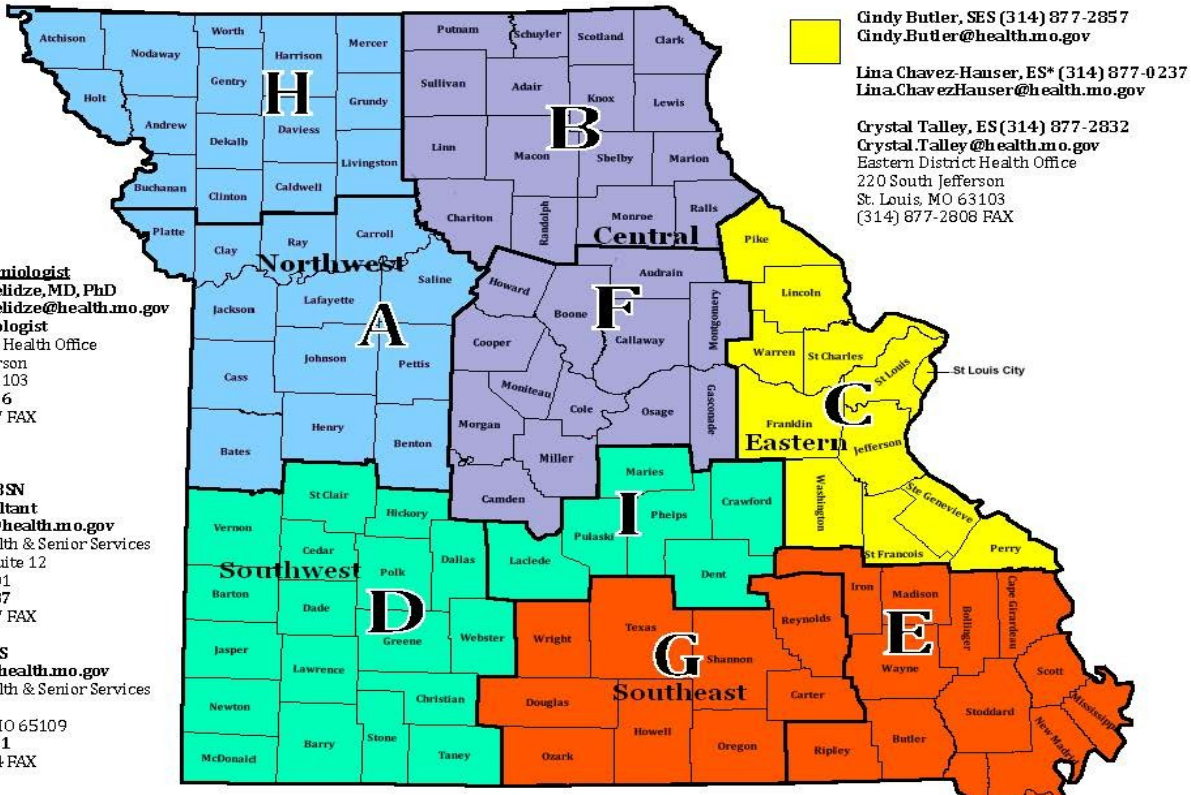

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Introduction

The Bureau of Communicable Disease Control and Prevention (BCDCP) provides prevention, intervention, and surveillance programs for ninety-one reportable communicable (or infectious) diseases and conditions of public health significance in Missouri. Many of these diseases are emerging infections (such as Multi-drug-resistant tuberculosis and Novel Influenza). The program also maintains a statewide disease registry and surveillance system (WebSurv) and performs analysis of morbidity to identify trends and risk factors for public health messaging. In addition to WebSurv, the Electronic Surveillance System for Early notification of Community-Based Epidemics (ESSENCE) is a statewide syndromic surveillance system that examines chief complaint data from hospitals, emergency rooms, over the counter drug sales, and information from the poison control centers. The BCDCP works closing with 115 local public health agency (LPHA) partners to protect Missouri's citizens and visitors from the threats of infectious diseases of public health significance.

BCDCP services include:

- Conducting epidemiological studies to investigate the cause, origin, and method of transmission of communicable diseases in order to identify and implement appropriate disease control and preventive measures, such as contact identification, testing, treatment, and source identification.
- Identifying communicable disease surveillance data needs, design data collection processes/systems, develop and maintain data systems and datasets, analyze and interpret data at regular intervals to track trends and provide regular reports on these analyses to support targeted interventions.
- Consulting with LPHAs, government at all levels, community organizations, hospitals, health care providers, private businesses, media, and others regarding diagnosis, and control measures for reportable communicable diseases and provide public health education as requested.
- Providing training and technical assistance/consultation to local health officials on disease investigations, control activities, and analysis/interpretation of data to prevent communicable diseases in their communities and rapidly respond to outbreaks.
- Providing community planning and rapid epidemiologic response for emergencies such as bioterrorism, pandemic influenza, and natural disasters such as flooding, earthquakes and catastrophic weather events.
- Providing the treatment of tuberculosis (TB) disease or infection, as well as tuberculin skin testing materials for use in extended contact investigations and assisting LPHAs with TB case management.
- Providing assistance to local health officials in the screening and treatment of public health conditions in newly arriving refugees.
- Collaborating with other programs within the Missouri Department of Health and Senior Services (DHSS), other state and federal agencies, and community-based organizations in emergency event planning and response.

The DHSS rule for the **Reporting of Communicable, Environmental and Occupational Diseases**, can be found at: 19 CSR 20-20.020. This report contains information only for those diseases and conditions that are addressed by the BCDCP. Information and statistics for HIV, STD, and Hepatitis can be found by clicking on Bureau of HIV, STD, and Hepatitis.

Introduction

Data used in this report were gathered from disease and condition reports made by medical providers, laboratories, hospitals, LPHAs, and others.

The information collected through 19 CSR 20-20.020 flows from the local public health jurisdictions to DHSS and on to the national Centers for Disease Control and Prevention (CDC). Data are linked to the national level through the CDC's National Electronic Telecommunications Surveillance System (NETSS). This information is critical for two reasons:

1. It enables public health agencies to act quickly to prevent the spread of disease, and
2. It provides an overall view of disease trends at the local, state and national levels. Analysis of these trends permits targeting of scarce resources where they are most needed and allows the assessment of the effectiveness in preventing and controlling disease.

There are limitations to the data provided in this report for the following reasons:

- sick people do not always seek healthcare; and,
- healthcare providers and others do not always recognize, confirm, or report notifiable conditions.

Therefore, reported cases may represent only a fraction of the actual burden of disease.

BCDCP is pleased to provide the following summary of data relating to over 52,383 cases that were reported during calendar year 2012. In addition to the contributors listed on the previous page, BCDCP would like to recognize the staff of Missouri's State Public Health Laboratory and the thousands of people in LPHAs, clinics, hospitals and clinical laboratories throughout Missouri whose disease reports and efforts constitute the basis for this document. Without vigilant reporting of disease, targeted and effective prevention and control measures cannot be implemented.

While this report was compiled by DHSS, please keep in mind that most of the public health workforce is in city or county health departments. Therefore, much of the work is at that level. The state, county, and city health departments and their private-sector partners work to promote health, protect against illness and injury, and render public health services to all people in Missouri.

A table of all reported notifiable diseases is located here. Where spatial analysis and use of Geographic Information Systems (GIS) was useful, maps have been provided to depict the data. Hyperlinks to additional information are included throughout the document.

The hope is that you find this report informative and useful. Your questions and comments are invited on this report, "Communicable Disease Surveillance 2012 Annual Report".

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Executive Summary

Annually, through the combined efforts of the LPHAs and state partners, communicable disease investigation and control activities require a substantial amount of public health resources to be utilized. In 2012, a total of 52,383 conditions were reported, investigated, and entered into Missouri's communicable disease registry system known as WebSurv. The information contained within the WebSurv system is used to monitor trends at all levels, which include national, state, district, and local.

An important partner in communicable disease investigation and control efforts is the Missouri State Public Health Laboratory (MSPHL). The MSPHL provides technical assistance through consultations, both with LPHAs and their respective hospitals, as well as offering specialized testing services. About 5,000,000 tests (many required by law) are performed by the MSPHL each year. Approximately 406,920 mailing kits are assembled and distributed each year for the return of specimens from hospitals and private laboratories as well as city, county and district health offices. In addition to the analysis of Missouri resident samples, the MSPHL also tests non-resident samples when called upon by other states. Per rule 19 CSR 20-20.080 (Duties of Laboratories), laboratories are required to report the result of any test that is positive for, or suggestive of any disease or condition listed in 19 CSR 20-20.020. Laboratories are also required to send certain isolates to the MSPHL for epidemiological or confirmation purposes.

Although it is our hope that all isolates or specimens listed in subsection (3) of 19 CSR 20-20.080 be submitted to the MSPHL for further classification that is not always the case; percents listed in this report will reflect the number that were actually received and further characterized by the MSPHL and may be less than 100%, this is an artifact of submission of the isolates by outside laboratories to the MSPHL and not the ability of the MSPHL to do the testing. Further characterization of those isolates in part allows Missouri to continue participation in PulseNet, which aids BCDCP in the ability to more readily identify potential outbreaks both locally and nationally.

This document represents a summary of select diseases of public health significance in Missouri. The conditions selected for this year's summary include three gastrointestinal illnesses (Shiga toxin-producing *Escherichia coli* (STEC) infection, salmonellosis and vibriosis), five respiratory illnesses (*Haemophilus influenzae* invasive disease, influenza, legionellosis, pertussis, tuberculosis disease, and latent tuberculosis infection (LTBI)), two arthropod transmitted diseases (tularemia and West Nile neruoinvasive disease (WNND)) as well as animal bites, rabies (animal and human), and rabies post-exposure prophylaxis (RPEP).

Statewide in 2012, a total of 308 cases of STEC associated infections were reported, which was a 101.3% increase compared to the previous five-year median. The increase in cases resulted in the highest rate of reported STEC cases observed during the past decade. A potential life-threatening complication of STEC infection is called hemolytic uremic syndrome (HUS). A total of 18 cases of HUS were reported among residents of Missouri in 2012, which is an increase of 38.5% compared to the previous five-year median. A seasonal trend for STEC was noted in Missouri, with over half of the cases, occurring during the months of May through September.

The number of reported cases of salmonellosis in Missouri increased in 2012. Statewide, a total of 1,071 cases of salmonellosis were reported, which was a 40.2% increase in the number of cases as compared to the previous five-year median. A seasonal trend for salmonellosis was noted in Missouri, with over half of the cases occurring in the months of May through September. Nine *Salmonella* outbreaks were

Executive Summary

reported in Missouri in 2012. In addition, three cases of *Salmonella* Typhi (typhoid fever) were reported in Missouri. Each of the three cases reported foreign travel prior to onset of illness.

Statewide in 2012, eight cases of vibriosis were reported. Although eight cases may seem small, this is significant because it represents a 700% increase from the median for the previous five years. Vibriosis tends to be seasonal as over 70% of the cases reported nationally occur during the months of May through October.

A total of 82 cases of *H. influenzae* invasive disease were reported in Missouri during 2012, representing a 13.9% increase in reported cases compared to the previous five year median. Age is a significant risk factor for *H. influenzae* invasive disease. The highest age specific incidence rates occurred among children less than one year of age and in persons over the age of 64 years. A total of three of the five districts statewide observed increases in reported cases of *H. influenzae* invasive disease in 2012. The cause for this increase is not known.

During 2012, there were 69 cases of legionellosis reported in Missouri, which was a 21.1% increase in the number of cases compared to the previous five-year median. There appears to be seasonality to legionellosis as the majority of cases were reported in Missouri during the months of April through October. There was one outbreak of legionellosis in 2012. The cases had epidemiological linkage to the same Missouri lodging facility. A hot tub at the facility was later determined to have critical deficiencies.

Following a two-year decline in reported cases in 2010 and 2011, pertussis incidence increased in Missouri in 2012. A total of 815 cases were reported in 2012, exceeding the previous five-year median by more than 45%. A seasonal trend for pertussis was noted in Missouri, with over half of the cases, occurring from April through August. There were two school-associated outbreaks reported during the year. Several factors may have contributed to the increase in reported cases, including increased awareness and improved recognition of pertussis among clinicians, greater access to and use of laboratory diagnostics, increased surveillance and reporting of pertussis to public health departments, and waning immunity from pertussis vaccines.

In 2012, 89 cases of TB disease were reported in Missouri. This represents a decrease by 16% when compared to the previous five-year median. There were 14 deaths; two of the fourteen persons who died with TB disease were diagnosed at death, twelve died during treatment. Seventeen percent of Missouri's TB disease cases were considered preventable in 2012, as compared to 57% of cases in 2005. No TB disease outbreaks were reported in 2012; however one TB disease case required an extended contact investigation. In addition, 2,601 cases of LTBI were reported in Missouri in 2012. Missouri is one of only a few states that require the reporting of persons with LTBI. The treatment of LTBI substantially reduces the risk that persons infected with *Mycobacterium tuberculosis* will progress to TB disease.

The 2012-2013 influenza season began September 30, 2012, and ended May 18, 2013. During the 2012-2013 season, 37,037 influenza cases were reported in Missouri for a rate of 616.2 cases per 100,000 population. Influenza B was the predominant strain in Missouri accounting for 55.1% of reported cases. Nationally, influenza A (H3N2) influenza viruses predominated, followed by influenza B viruses. There were seven influenza outbreaks reported during the 2012-2013 season, compared to the fourteen outbreaks reported in Missouri during the 2011-2012 season.

Executive Summary

Missouri typically leads the nation in the number of tularemia cases reported each year. There tends to be a common seasonality for tularemia in Missouri, as more cases are typically reported during the months of May through September. The increase in cases during this time may be the result of increased activity of the tick vector and persons participation in outdoor activities during these months. A total of 27 tularemia cases were reported in 2012, which represents a 28.6% increase over the previous five-year median. The national incidence rate has been remarkably stable over the last decade while incidence rate in Missouri shows much more variability.

In 2012, West Nile Virus Neuroinvasive Disease (WNND) increased by 200% (n=18) when compared to the previous five-year median. As with many other vector borne diseases, the number of cases reported each year follows a seasonal trend. In Missouri, the majority of cases are detected during the months of June through September. The increase in cases observed in 2012, may be due to a number of factors such as greater circulation of the *flavivirus* in nature, increased awareness, greater access to diagnostic tests, better reporting, or to other unknown factors.

During 2012, 28 cases of animal rabies were detected in Missouri, compared to 29 cases the previous year, representing a 3% decrease. The number of rabid animals detected each year varies according to several factors. No human rabies deaths were recorded in Missouri for 2012. A total of 370 persons were reported to have started the RPEP during 2012, which was almost 43% above the previous five-year median of 259 reports. Physicians should evaluate each possible exposure to rabies and, if necessary, consult with local or state public health officials regarding the need for rabies prophylaxis.

Of particular note is the consistent challenges faced in public health with regard to developing effective educational methods and materials to prevent disease. Through our partnerships we offer many types of opportunities to increase awareness of public health issues. Each year the MDHSS offers webinars on pertinent public health topics, Epi Grand Rounds for health professionals to sharpen their skills, accredited learning curriculums to bolster our partner knowledge base and media (including social media) campaigns to foster community awareness of issues related to public health. In addition, aggressive vaccination campaigns are undertaken each year to decrease rates of disease. The activities aforementioned are not exclusive but only a small sample of the effort taken each year to protect the citizens of Missouri.

This is a small synopsis of the information contained within the 2012 Annual Report. It should be duly noted that Missouri's partners at each LPHA contributed significantly to the investigation of communicable diseases, the continued surveillance of those diseases, and the control and prevention efforts undertaken with regard to communicable diseases in 2012. It is our hope that the information included in this report will be used in the pursuit of the overarching goal of protecting and improving the health of the citizens of Missouri.

Section A - Communicable Disease Surveillance

Disease Outbreaks

BCDCP maintains a database and provides on-site and technical assistance to the LPHAs on reported outbreaks. BCDCP also contributes to several national reporting systems such as the National Outbreak Reporting System (NORS), CDC's OutbreakNet Team, and PulseNet, national network of public health and food regulatory agency laboratories coordinated by CDC. These systems are used to rapidly identify potential outbreaks in order to implement effective measures to prevent illness and reduce the public health threat. BCDCP reviews outbreaks for lessons learned and any new information on disease reservoirs, modes of transmission, control strategies and provide data to CDC for national analysis.

Reported Outbreaks By Disease or Condition, Missouri 2012

Diseases and Conditions	Number of Outbreaks
Gastrointestinal	
Acute Gastrointestinal Illness - etiology unknown	17
E. coli O157:H7	3
E. coli O26	1
Hepatitia A	1
Norovirus	16
Salmonellosis	9
Shiga toxin-producing *E. coli*	1
Vibrio parahaemolyticus	1
Total	**49**
Vaccine Preventable	
Pertussis	2
Varicella (Chickenpox)	5
Total	**7**
Total Outbreaks*	**101**

Diseases and Conditions	Number of Outbreaks
Respiratory	
Acute Respiratory Illness	2
Influenza	16
Legionellosis	1
Tuberculosis	1
Total	**20**
Other	
Febrile Illness	1
Fifth Disease	1
Hand, Foot, and Mouth Disease	13
Oral Lesions	1
Rash (unknown agent)	1
Ringworm	1
Scabies	8
Total	**26**

* One outbreak identified two agents

Diseases of Note

There are several notable decreasing and increasing disease trends as reflected in the 15 year report.

Decreasing Trends:

- Shigellosis, with 71 cases reported in 2012, continued to decrease with a –93.2% from the 5-year median 2007 to 2011. There was (0) reported outbreaks in 2012; compared to one reported outbreak in 2011.

Increasing Trends:

- Shiga toxin-producing *E. coli* (STEC), with 308 cases reported in 2012, increased 101.3% from the 5-year median 2007 to 2011. There were five outbreaks of STEC reported in 2012. For additional information, click here.
- Influenza, with 37,037 cases reported in 2012, increased 80.9% from the 5-year median 2007 to 2011. There were seven outbreaks reported during the 2012-2013 season. For additional information, click here.

Section A - Communicable Disease Surveillance

Reported Diseases and Conditions, Comparative Statistics, Missouri 2012						
Condition and/or Disease	Case Count	5-Year First Quartile	5-Year Median	5-Year Third Quartile	Percent Change from Median	Rate per 100,000
Acute Gastrointestinal Illness	2,666	3,191	3,405	3,698	-21.7%	44.4
Adult Respiratory Distress Syndrome (ARDS)	5	3	3	4	66.7%	0.1
Animal Bites	7,076	6,288	6,638	6,917	6.6%	117.7
Botulism Infant	1	0	0	2	N/A	0
Brucellosis	1	0	1	2	0%	0
Campylobacteriosis	567	770	815	919	-30.4%	9.4
Chlamydia	27,835	24,817	25,868	26,049	7.6%	463.1
Coccidioidomycosis	17	9	11	15	54.5%	0.3
Creutzfeldt-Jakob Disease (CJD)	8	5	8	8	0%	0.1
Cryptosporidiosis	239	195	214	495	11.7%	4
Cyclosporiasis	2	0	0	0	N/A	0
Dengue Fever	6	3	5	5	20%	0.1
E. Coli Shiga Toxin Positive	150	75	77	131	94.8%	2.5
E. Coli (All)	308	152	153	236	101.3%	5.1
E. Coli O157 H7	158	76	80	105	97.5%	2.6
Ehrlichiosis & Anaplasmosis (All)	228	167	194	222	17.5%	3.8
Encephalitis Primary	1	0	0	0	N/A	0
Giardiasis	330	426	468	515	-29.5%	5.5
Gonorrhea	7,889	7,159	7,802	8,014	1.1%	131.2
HIV Disease	540	536	575	585	-6.1%	9
Haemophilus Influenzae, Invasive	82	63	72	80	13.9%	1.4
Hansen's Disease (Leprosy)	3	0	2	2	50%	0
Hemolytic Uremic Syndrome	18	9	13	18	38.5%	0.3
Hepatitis A, Acute	21	24	27	30	-22.2%	0.3
Hepatitis B, (Infant) Perinatal	1	0	0	0	N/A	0
Hepatitis B, (Pregnancy) Prenatal	138	136	136	141	1.5%	2.3
Hepatitis B, Acute	48	40	47	60	2.1%	0.8
Hepatitis B, Chronic Infection	350	248	278	328	25.9%	5.8
Hepatitis C, Acute	4	2	5	6	-20%	0.1
Hepatitis C, Chronic Infection	4,722	4,463	4,842	4,921	-2.5%	78.6
Hepatitis E, Acute	1	0	0	0	N/A	0
Hepatitis Other Or Unspecified	1	0	0	0	N/A	0
Influenza Death < 18 Years	1	0	0	1	N/A	0
Influenza***	37,037	17,739	20,474	30,567	80.9%	616.2
Legionellosis	69	50	57	65	21.1%	1.1
Listeriosis	8	11	12	14	-33.3%	0.1
Lyme	2	8	10	10	-80%	0
Malaria	19	14	14	21	35.7%	0.3
Meningococcal Disease	16	18	23	26	-30.4%	0.3
Mumps	5	10	11	12	-54.5%	0.1
Pertussis	815	438	561	604	45.3%	13.6
Q Fever (All)	3	3	3	5	0%	0
Rabies Animal	28	38	63	64	-55.6%	N/A
Rabies Post Exposure Prophylaxis	370	232	259	294	42.9%	6.2
Rocky Mountain Spotted Fever	315	270	278	315	13.3%	5.2
Salmonellosis	1,071	764	764	843	40.2%	17.8
Shiga Toxin + (Non E. Coli - Unknown Organism)	14	0	1	9	1300%	0.2
Shigellosis	71	227	1,046	1,276	-93.2%	1.2
Staph Aureus VISA	33	1	1	3	3200%	0.5
Strep Disease, Group A Invasive	129	94	97	142	33%	2.1
Strep Pneumo (All)	154	115	131	134	17.6%	2.6
Strep Pneumoniae, Drug-Resistant	120	74	91	93	31.9%	2
Strep Pneumoniae, < 5 Years, Invasive	34	35	40	41	-15%	0.6
Syphilis, Primary and Secondary	157	152	173	224	-9.2%	2.6
Tetanus	1	2	2	2	-50%	0
Tick-borne Diseases	572	443	493	582	16%	9.5
Toxic Shock (Staph) Syndrome	4	2	2	3	100%	0.1
Toxic Shock (Strep) Syndrome	1	1	2	2	-50%	0
Tuberculosis	89	98	107	107	-16.8%	1.5
Tuberculosis Infection	2,601	2,575	3,393	3,573	-23.3%	43.3
Tularemia	27	18	21	21	28.6%	0.4
Typhoid Fever	3	2	2	3	50%	0
Varicella (Chickenpox)	388	488	573	774	-32.3%	6.5
Vibriosis****	8	N/A	N/A	N/A	600%	0.1
West Nile Fever	3	0	3	4	0%	0
West Nile Virus Neuroinvasive Disease	18	5	6	12	200%	0.3
Yersiniosis	13	6	8	10	62.5%	0.2
Zoonotic Diseases	613	470	525	669	16.8%	10.2

**Not a reportable disease in at least 3 of the last 5-years. The count mean of the years reported is used in this situation if available.
***Influenza is reported based on the Influenza Season Year. 2012 includes Weeks 40 to 52 of 2012 and Weeks 1 to 20 of 2013.
****In Missouri, vibriosis became reportable in 2008 providing only 4 years of data. N/A=No computation made. Data Source: WebSurv.

Section A - Communicable Disease Surveillance

Haemophilus Influenzae, Invasive Disease

2012 Case Total 82 **2012 Incidence Rate 1.4 per 100,000**
2011 Case Total 80 **2011 Incidence Rate 1.3 per 100,000**

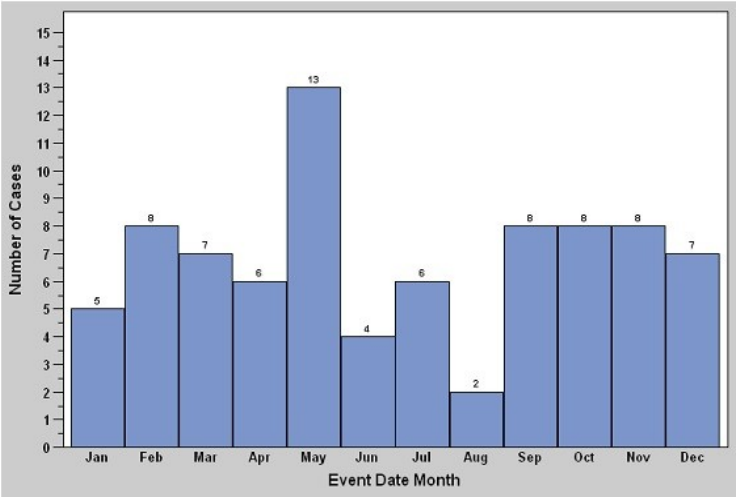
Click to view

Haemophilus influenzae (*H. influenzae*) includes a group of bacteria that can cause many kinds of infections. In spite of it's name, *H. influenzae* does not cause influenza (the "flu"). The infections caused by *H. influenzae* can range from mild ear infections to potentially fatal disease including bacteremia and meningitis. When the bacteria invade parts of the body that are normally free from pathogens, like spinal fluid or blood, this is known as "invasive disease". *H. influenzae* is generally spread from person-to-person through respiratory droplets by coughing and sneezing or by direct contact with respiratory tract secretions. Infection may also be spread to neonates by aspiration of amniotic fluid or by contact with infected genital tract excretions. The incubation period is unknown, but likely 2-4 days. Persons remain communicable as long as the organism is present. Persons are no longer considered communicable 24-48 hours after starting appropriate antibiotic treatment.

H. influenzae are broadly divided into two different groups, encapsulated and unencapsulated (nontypable), based on their ability to produce an outer capsule. Among the encapsulated strains there are six identifiable serotypes, which are designated a through f. Although all *H. influenzae* can cause invasive disease, currently *H. influenzae* type b (Hib) is of greatest public health concern. Prior to the introduction of effective vaccines, Hib was the leading cause of bacterial meningitis and other invasive infections among infants and children younger than five years of age. Invasive disease due to Hib is often severe, approximately 2%-5% of Hib meningitis cases result in death and up to 30% of persons may experience permanent hearing loss or other neurologic side effects despite appropriate antimicrobial therapy. With the availability of the Hib vaccine, the incidence of invasive Hib disease in the U.S. has decreased by 99%.

Even though *H. influenzae* invasive disease, including Hib occurs most often in infants and children younger than five years of age; adults 65 years and older are also at a increased risk. American Indian/ Alaska Native populations are also at increased risk for invasive *H. influenzae* disease. People with certain medical conditions are at higher risk for developing a *H. influenzae* infection such as: Sickle cell disease; asplenia (no spleen); HIV (human immunodeficiency virus) infection; antibody and complement deficiency syndromes; and malignant neoplasms. For more information on *H. influenza*e visit: http://www.cdc.gov/hi-disease/about/index.html.

Reported Number of Haemophilus Influenzae Cases, Confirmed and Probable
By Event Date Month, Missouri, 2012



Missouri Incidence: In 2012, *H. influenzae* invasive disease increased by 13.9% when compared to the previous five-year median data from 2007-2011. Cases decreased during the summer months of June through August. Persons with invasive disease ranged in age from 2 days to 93 years, with a median age of 62 years. Age is a significant risk factor for invasive disease. The highest age specific incidence rates (IR) per

Section A - Communicable Disease Surveillance

Haemophilus Influenzae, Invasive Disease-continued

100,000 population occurred among children <1 year of age which was 6.6 cases per 100,000 population and in persons >64 years of age which was 4.2 cases per 100,000 population. Three of the five health districts observed increases in reported cases. The increases were relatively minimal with the exception of Northwest where an increase of 87.5% above the previous five-year median was observed. The cause for this increase is not known.

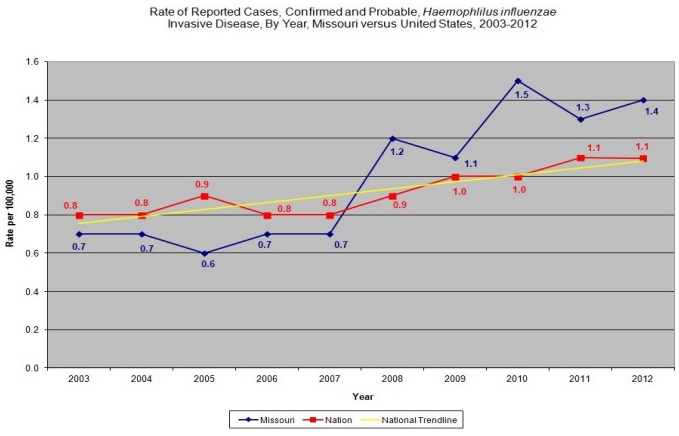
Haemophilus Influenzae, Invasive Disease
Comparative Statistics by Socio-demographic Category, Missouri 2012[1]

		Case Count	Percent of Total	Rate per 100,000	5-Year Median	Percent Change from Median
Sex	Female	43	52.4%	1.4	45	-4.4%
	Male	39	47.6%	1.3	27	44.4%
Race	Black	14	17.1%	1.9	9	55.6%
	Other	3	3.7%	1.9	0	N/A
	Unknown	16	19.5%	N/A	N/A	N/A
	White	49	59.8%	1	39	25.6%
Age Group	00 to <01	5	6.1%	6.6	7	-28.6%
	01 to 04	3	3.7%	1	3	0%
	05 to 14	2	2.4%	0.3	2	0%
	15 to 24	3	3.7%	0.4	1	200%
	25 to 39	11	13.4%	1	4	175%
	40 to 64	22	26.8%	1.1	17	29.4%
	65 and older	36	43.9%	4.2	32	12.5%
District	Central	7	8.5%	1	6	16.7%
	Eastern	32	39%	1.4	34	-5.9%
	Northwest	30	36.6%	1.9	16	87.5%
	Southeast	2	2.4%	0.4	5	-60%
	Southwest	11	13.4%	1	10	10%
	State of Missouri	82	100%	1.4	72	13.9%

[1]Socio-demographic Category Information is missing for some cases. N/A=No computation made.
Data Source: Missouri Health Information Surveillance System (WebSurv).

The highest proportion of cases occurred in the Eastern district 39.0% (n=32) resulting in an IR of 1.4 cases per 100,000 population. However, the highest district specific IR of 1.9 cases per 100,000 population (n=30) was observed in Northwest. The remaining district specific IR included Central 1.0 cases per 100,000 (n=7), Southwest 1.0 cases per 100,000 (n=11) and Southeast 0.4 cases per 100,000 (n=2). Females accounted for 52.4% of cases, 63.4% (n=52) of the cases were hospitalized and there were 8 deaths[¥] in 2012. The race specific IR was higher for blacks with a 1.9 cases per 100,000 population (n=14) as compared to whites with a IR of 1.0 cases per 100,000 population (n=49).

Clinical isolates of invasive diseases caused by *H. influenza*e identified by laboratories are required to be submitted to the Missouri State Public Health Laboratory (MSPHL) for confirmation and serotype identification. Noninvasive *H. influenza*e associated illnesses are not required to be reported to public health. The MSPHL received 82.9% (n=68) of the reported confirmed and probable cases. An additional Missouri case was reported through a bordering state's public health laboratory. Only two of the 82 reported cases were confirmed to be Hib. Missouri monitors the immunization compliance of children 19 months of age through kindergarten entry. In 2012, 94.9% of the children assessed had been adequately immunized for Hib (children assessed=20,313). During 2012, no outbreaks of *H. influenzae* invasive disease were reported in Missouri.



Challenges: *H. influenzae* bacteria including Hib, are often spread by people who have the bacteria in their noses and throats but are not ill. Although the availability and use of the Hib vaccine has reduced Hib invasive disease by 99%, the bacteria remains a threat especially to unvaccinated or incompletely vaccinated children. In addition, there is not a vaccine to prevent invasive disease caused by non-b *H. influenzae*.

Comparison with National Data: In 2012, the statewide IR was 1.4 cases per 100,000 population as compared to the national IR of 1.1 cases per 100,000 population. The *H. influenzae* IR per 100,000

Section A - Communicable Disease Surveillance

Haemophilus Influenzae, Invasive Disease-continued

population for Missouri ranged from 0.6 to 1.5 cases during the years 2003 to 2012, as compared to 0.8 to 1.1 cases per 100,000 population nationally for the same period. Nationally there continues to be a gradual upward trend in the annual rate of reported *H. influenzae* invasive disease. In 2008, the IR rate for Missouri surpassed the national IR and has remained above the national IR into 2012. The cause for this increase is not known.

The epidemiology of invasive *Haemophilus influenzae* disease has changed in the United States and in Missouri since the post vaccine era. Nontypeable *Haemophilus influenzae* now causes the majority of invasive disease in all age groups. Although Hib cases are now uncommon in Missouri, it is important we continue the diligent surveillance of *H. influenzae* invasive disease to promptly identify Hib cases and implement appropriate public health control measures (in certain circumstances, people in close contact with Hib disease should receive antibiotics to prevent them from getting the disease) and to detect emergence of invasive non-Hib disease. Illnesses caused by Hib in children are 3%-6% fatal; up to 20% of patients who survived Hib meningitis have permanent hearing loss or other long-term neurological sequelae. In addition, patients ≥65 years of age with invasive *H. influenzae* disease (Hib, non-b, and nontypable) have higher case-fatality ratios than children and young adults.

It is important that invasive *H. influenzae* disease continue to be promptly reported and investigated. The collection of accurate exposure information from the ill persons or their surrogates remains an integral component of public health surveillance. Diligent surveillance allows us to determine the incidence and epidemiologic characteristics of invasive *H. influenzae* disease; monitor the impact of Hib vaccination programs; detect possible emergence of disease due to non-b *H. influenzae;* and determine appropriate verification and validation criteria for serotyping. Serotype information for all *H. influenza*e invasive disease cases is essential and will generate data needed to examine strategies for elimination of this disease.

Prevention: There's a vaccine that can prevent disease caused by Hib, but not the other types of *H. influenzae.* It is critically important to continue to promote the vaccination of children for the prevention of Hib, which is the most proven measure of prevention against Hib. Hib vaccine is recommended for all children younger than 5 years of age in the U.S. and it is usually given to infants starting at 2 months of age. There is evidence that Hib vaccines decrease the rate of carriage of Hib among vaccinated children, thereby decreasing the chance that unvaccinated children will be exposed. Other preventive measures to reduce the risk of *H. influenzae* associated diseases include the education and implementation of good hand washing and appropriate cough/sneeze etiquette. Protective factors for Hib for some infants (effect limited to infants younger than 6 months of age) include breastfeeding and passively acquired maternal antibody. For additional prevention information visit: http://www.cdc.gov/hi-disease/about/prevention.html.

Additional Website Resources:

CDC Health Topics

CDIRM

Section A - Communicable Disease Surveillance

Influenza

2012 Case Total 37,037 **2012 Incidence Rate 616.2 per 100,000**
2011 Case Total 20,474 **2011 Incidence Rate 341.9 per 100,000**

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Influenza is a contagious viral respiratory illness caused by three types of influenza viruses, types A, B and C. Influenza A viruses are further characterized into subtypes based on their surface proteins. Influenza virus types A and B are responsible for seasonal influenza epidemics each year, with influenza A viruses being the most severe. Over the course of a influenza season, it is common for various influenza A subtypes and influenza type B to circulate. Influenza and pneumonia combined are among the top 10 leading causes of death in the U.S. An average of 36,000 deaths and more than 200,000 hospitalizations are associated with influenza annually. In Missouri, an average of 2,800 influenza and pneumonia associated deaths occurred annually during the five previous influenza seasons.

Influenza infections can vary from asymptomatic (no symptoms) to severe and potentially fatal disease. Illness is characterized by abrupt onset of fever, chills, headache, malaise, diffuse myalgia, and nonproductive cough. Sore throat, nasal congestion, rhinitis, and cough become more prominent as symptoms progress. Most people with influenza illness recover within a week, but a cough and fatigue can linger longer. Dehydration, bronchitis, and bacterial pneumonia, are examples of complications from influenza. Influenza can also exacerbate chronic health problems such as asthma, chronic lung disease, chronic congestive heart failure, and other existing conditions. Persons 65 years and older, children under the age of two, and persons of any age with chronic medical conditions are at highest risk for serious complications of influenza.

The influenza season for national reporting purposes is defined as the period usually between the first week of October (week 40) of one year and mid-May of the next (week 20). Influenza seasons are unpredictable particularly as to when they begin, the severity, which viruses will circulate, and the effectiveness of the influenza vaccine. The U.S. Food and Drug Administration's Vaccines and Related Biological Products Advisory Committee considers the World Health Organizations recommendations and makes a final decisions regarding the composition of seasonal influenza vaccine for the U.S. The recommendations for the upcoming influenza season are generally released in February.

Missouri Incidence: The 2012-2013 influenza season began September 30, 2012, and ended May 18, 2013. A total of 37,037 influenza cases were reported in Missouri resulting in an incidence rate (IR) of 616.2 cases per 100,000 population. The number of reported cases by virus type included influenza A 14,615 (39.5%), influenza B 20,403 (55.1%), and 2,019 (5.5%) of cases with an influenza virus type that was unknown or not reported. The 2012-2013 influenza season was notable as influenza B was the predominant strain among reported cases in Missouri. In 2012, reported influenza cases increased by 80.8% when compared to the five-year median data from 2007-2011.

Reported Inluenza Cases by Type, For the 2012-2013 Flu Season, As Compared to the 5-Season Median 2007-2012, Missouri

Influenza Type	2012-13 Season	Percent of Total	5-Season Median	Percent Change from 5-Season Median
Influenza A	14,615	39.5%	18,135	-19.4%
Influenza B	20,403	55.1%	3,845	430.6%
Influenza Unknown Or Untyped	2,019	5.5%	1,338	50.9%
Total	37,037	100%	20,485	80.8%

The 2012-2013 influenza season began relatively early

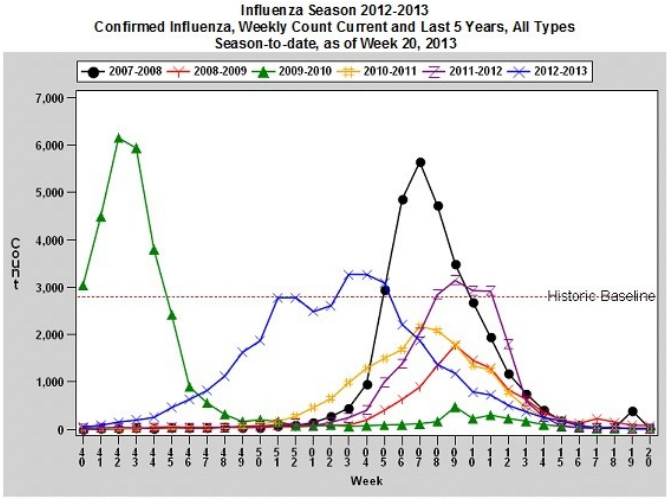
Section A - Communicable Disease Surveillance

Influenza - continued

in late September and peaked in late December. Nationally, influenza activity remained elevated through the week ending March 9, 2013. Approximately 56.6% of all reported influenza cases were less than 15 years of age. Persons 50 years of age or older accounted for 16% of all influenza cases reported in Missouri. The age group of 15-24 and 25-49, accounted for 27.5% of cases.

The highest proportion of cases, 30.8% (n=11,422) was observed in Northwest district. However, the highest district IR of 1,177.7 per 100,000 (n=5,601) was observed in the Southeast district. The other district specific IR included Central 760.7 per 100,000 population, Northwest 725.6 per 100,000 population, Southwest 533.4 per 100,000 population, and Eastern 415.6 per 100,000 population.

Only clinical isolates of influenza-associated pediatric mortality (i.e., deaths in children younger than 18 who test positive for influenza) identified by laboratories are required to be submitted to the Missouri State Public Health Laboratory for confirmation and identification. No pediatric influenza-associated deaths were reported in Missouri during the 2012-2013 influenza season. In addition, a random sample of influenza isolates are also selected and submitted to CDC for further testing. A total of 42 isolates from Missouri were submitted to CDC for antigenic characterization during the 2012-2013 season. The characterization of the isolates submitted included: (21) B/WISCONSIN/01/2010-LIKE, (15) A/ Victoria/361/2011-LIKE (H3N2) GP, (2) B/ BRISBANE/60/2008-LIKE, and (4) A/ CALIFORNIA/07/2009-LIKE (H1N1)pdm09.



Historic Baseline is calculated as the mean weekly count of the reported confirmed flu cases plus 3 standard deviation from the 2008-2009, 2010-2011 and 2011-2012 flu seasons.

Reported Influenza Cases by Select Age Groups for the 2012-2013 Flu Season, Compared to 5-Season Median 2007-2012, Missouri

Age Group	Count	Percent of Total	5-Season Median	Percent Change from 5-Season Median
00-<02	2,913	7.9%	1,865	56.2%
02-04	5,217	14.1%	3,476	50.1%
05-14	12,820	34.6%	6,506	97%
15-24	3,228	8.7%	2,669	20.9%
25-49	6,955	18.8%	3,521	97.5%
50-64	3,179	8.6%	1,297	145.1%
65 & older	2,725	7.4%	828	229.1%
Total	37,037	100%	20,485	80.8%

Reported Influenza Cases by Health District for the 2012-2013 Flu Season, as Compared to the 5-Season Median 2007-2012, Missouri

Region	Count	Percent of Total	Rate per 100,000	5-Season Median	Percent Change from 5-Season Median
Central	5,088	13.7%	760.7	3,340	52.3%
Eastern	9,290	25.1%	415.6	6,052	53.5%
Northwest	11,422	30.8%	725.6	6,461	76.8%
Southeast	5,601	15.1%	1177.7	2,126	163.5%
Southwest	5,636	15.2%	533.4	3,767	49.6%
Total	37,037	100%	616.2	20,485	80.8%

Seven influenza associated outbreaks were reported in Missouri during the 2012-2013 season, which was less than the 14 influenza outbreaks reported during the previous season. The 14 influenza associated school closures reported during the 2012-2013 influenza season was consistent with the 14 school closure reported during the previous season.

Determining the specific causes for the 80.8% increase in reported influenza cases observed in Missouri during the 2012-2013 season is difficult. Possible causes may have included the type and subtype of the influenza viruses that circulated, improved availability of rapid influenza tests, improved reporting, or to other unknown factors.

Section A - Communicable Disease Surveillance

Influenza - continued

Challenges: There are many public health challenges associated with influenza. Most healthy adults are infectious one day before symptoms develop and up to five to seven days after becoming ill. Persons can also be infected with the influenza virus and have no symptoms. In both instances, an apparently healthy person could spread influenza virus to others. Influenza viruses change and therefore influenza vaccines must also be evaluated for change annually. Once the vaccine composition is selected, manufacturers operate under a very tight timeline for producing, testing, releasing and distributing the vaccine. Problems encountered during production may cause shortages or delays. The unpredictability of vaccine production, distribution, and availability does not always coincide with peak demand for the vaccine. An additional public health challenge associated with influenza is the potential emergence of new variants of the virus. Animals, especially birds, carry influenza viruses, which can mutate into new variants of the virus, which can become capable of infecting humans. New influenza variants are of great concern as they have the potential of causing a pandemic and could circulate prior to the availability of new influenza vaccines. Therefore, the ongoing surveillance activities for influenza are critically important. Health care providers should also consider influenza a possible cause of respiratory illness outside of the typical influenza season.

Comparison to National Data: Individual cases of influenza are not a nationally reportable; therefore direct comparison of national and Missouri specific influenza data is difficult. However, data from the weekly percentage of outpatient visits for Influenza-Like Illness (ILI), as reported by the U.S. Outpatient ILI Surveillance Network (ILINet), is comparable. Nationally, the weekly percentage of outpatient visits for ILI met or exceeded the national baseline level of 2.2% for 15 weeks during the 2012-2013 influenza season. The peak percentage of outpatient visits for ILI was 6.1%, and occurred in the week ending December 29, 2012 (week 52). The weekly percentage of outpatient visits for ILI in Missouri, exceeded the Missouri specific baseline of 1.66% for 26 weeks during the weeks ending October 6, 2012, through March 31, 2013. The percentage of visits for ILI peaked at 6.29% during the week ending January 19, 2013 (week 3).

During the 2012-2013 season, influenza A (H3N2), influenza B viruses and influenza A (H1N1) pdm09 (pH1N1) were reported in the U.S. Regional differences were observed in the timing of influenza activity and the relative proportions of circulating viruses. Nationally, influenza A (H3N2) influenza viruses predominated, followed by influenza B viruses. Influenza A pH1N1 viruses were identified less frequently. Most of the influenza virus isolates analyzed by the CDC were included in the 2012-2013 influenza vaccine. However, some influenza B viruses identified nationally did not match the influenza B virus component of the 2012-2013 vaccine. Nationally, a total of 149 influenza-associated pediatric deaths were reported during the 2012-2013 influenza season, exceeding the number reported annually since 2004. No influenza-associated pediatric deaths were reported in Missouri.

Prevention: The single best way to prevent seasonal influenza is to get vaccinated each year. Everyone older than six months of age (with rare exception) is recommended to get the influenza vaccination. Talk to your doctor or nurse if you have any questions regarding whether influenza vaccine is appropriate for you; and which influenza vaccine option is best for you and your family. To prevent influenza it is particularly important for persons who are at increased risk for severe complications from influenza, or who are at high risk for influenza-related outpatient, emergency department, or hospital visits to receive the influenza vaccine annually.

Section A - Communicable Disease Surveillance

Influenza - continued

Influenza antiviral drugs are also available that can be used to treat and prevent influenza. Timely empiric antiviral treatment is recommended for patients with severe, complicated, or progressive influenza illness; those at higher risk for influenza complications; or those for whom treatment can be started within 48 hours of illness onset. Additional influenza prevention activities include incorporating the following good health habits:

1. **Avoid close contact.** Avoid close contact with people who are sick. When you are sick, keep your distance from others to protect them from getting sick too.
2. **Stay home when you are sick.** If possible, stay home from work, school, and errands when you are sick. You will help prevent others from catching your illness.
3. **Cover your mouth and nose.** Cover your mouth and nose with a tissue when coughing or sneezing. It may prevent those around you from getting sick.
4. **Clean your hands.** Washing your hands often will help protect you from germs. If soap and water are not available, use an alcohol-based hand rub.
5. **Avoid touching your eyes, nose or mouth.** Germs are often spread when a person touches something that is contaminated with germs and then touches his or her eyes, nose, or mouth.
6. **Practice other good health habits.** Clean and disinfect frequently touched surfaces at home, work or school, especially when someone is ill. Get plenty of sleep, be physically active, manage your stress, drink plenty of fluids, and eat nutritious food.

Additional information pertaining to influenza and influenza surveillance can be found on the Missouri Department of Health and Senior Services' website at http://www.health.mo.gov/Influenza/ and by visiting the CDC website at http://www.cdc.gov/flu/about/disease/index.htm.

Additional Website Resources:

CDC Health Topics

CDIRM

Section A - Communicable Disease Surveillance

Legionellosis

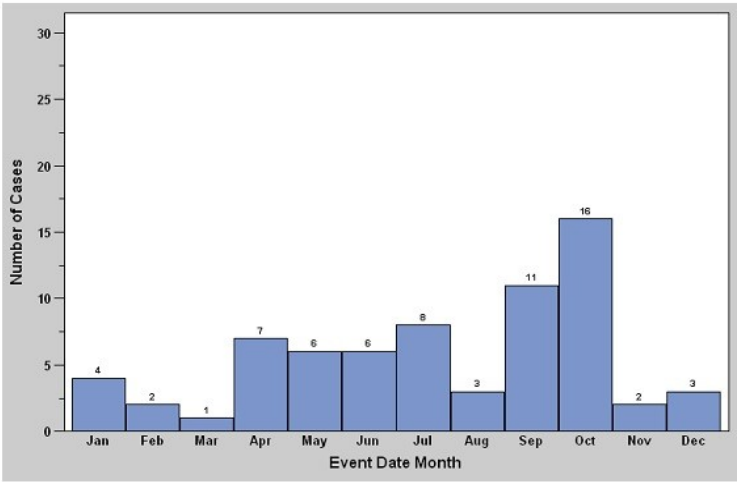
2012 Case Total 69 **2012 Incidence Rate 1.1 per 100,000**
2011 Case Total 57 **2011 Incidence Rate 1.0 per 100,000**

Click to View

Legionellosis refers to diseases caused by *Legionella* bacteria. There are at least 20 different species implicated in human disease, but the most common species causing infections in the U.S. are *Legionella pneumophila*, with most isolates belonging to serogroup 1. Pontiac fever and Legionnaires' disease are both infections that are referred to as legionellosis. People get legionellosis when they breathe in a mist or vapor (small droplets of water in the air) containing the bacteria. *Legionella* is naturally found in water (lakes, streams, and coastal oceans), especially warm water. The bacteria actually thrive in warm water and can contaminate hot water systems including showers, air conditioning cooling towers, humidifiers, hot tubs, respiratory therapy devices, and decorative fountains, which have all been associated with disease. Symptoms of Legionnaires' disease usually begin 2 to 14 days after exposure to the bacteria and 1 to 2 days following exposure for Pontiac fever. The initial symptoms often include anorexia, malaise, myalgia, headache, diarrhea, cough, and a high fever. Persons with Legionnaires' disease will typically develop pneumonia while Pontiac fever is a milder illness and is generally not associated with pneumonia. Most persons with Pontiac fever will recover fully, while 5-30% of Legionnaires' disease cases will be fatal despite the improved diagnostic and treatment methods. Most healthy individuals do not become infected with *Legionella* bacteria after exposure. People at higher risk of getting sick are: persons 50 years of age or older; current or former smokers, those with a chronic lung disease (like COPD or emphysema); those with a weak immune system from diseases like cancer, diabetes, or kidney failure, and people who are on drug therapies that suppress the immune system. For more information on legionellosis visit: http://www.cdc.gov/legionella/index.html.

Missouri Incidence: In 2012, legionellosis increased by 21.1% when compared to the five-year median data from 2007-2011. A seasonal trend for legionellosis is noted in Missouri, with over half (82.6%) of the cases, occurring in the warmer months of April through October (n = 57) for 2012.

Reported Number of Legionellosis Cases, Confirmed and Probable
By Event Date Month, Missouri, 2012



Persons with legionellosis ranged in age from 17 to 95 years, with a median age of 61 years. The highest age specific incidence rates (IR) per 100,000 population occurred among adults >64 years of age which was 3.0 cases per 100,000 population; followed by adults 40-64 years of age which was 1.7 cases per 100,000 population.

The highest proportion of cases occurred in the Eastern district (46.4%, n = 32) resulting in the highest district IR which was 1.4 cases per 100,000 population. The IR for the remaining districts are as follows: Central 1.2 cases per 100,000 population (n=8), Northwest 1.1 cases per 100,000 (n=18), Southwest 0.9 cases per 100,000 population (n=10), and Southeast 0.2 cases per 100,000 population (n=1). Missouri remained above the previous five-year median

Section A - Communicable Disease Surveillance

Legionellosis-continued

with all but one district observing an increase over the previous five-year median. The Central and Northwest districts observed increases of 60% and 100% respectively. The Eastern district had an increase of 6.7% and Southwest district had an increase of 25%; only the Southeast district showed a 75% decrease from the previous five-year median.

Males accounted for 55.1% of the cases, 79.7% (n=55) of the cases were hospitalized and 5 deaths[¥] were reported. The race specific IR was higher for blacks with a 1.6 per 100,000 population (n=12).

Legionellosis
Comparative Statistics by Socio-demographic Category, Missouri 2012[1]

		Case Count	Percent of Total	Rate per 100,000	5-Year Median	Percent Change from Median
Sex	Female	31	44.9%	1	20	55%
	Male	38	55.1%	1.3	37	2.7%
Race	Black	12	17.4%	1.6	7	71.4%
	Unknown	12	17.4%	N/A	N/A	N/A
	White	45	65.2%	0.9	40	12.5%
Age Group	00 to <01	0	0%	0	0	0%
	01 to 04	0	0%	0	0	0%
	05 to 14	0	0%	0	0	0%
	15 to 24	1	1.4%	0.1	1	0%
	25 to 39	7	10.1%	0.6	3	133.3%
	40 to 64	35	50.7%	1.7	28	25%
	65 and older	26	37.7%	3	25	4%
District	Central	8	11.6%	1.2	5	60%
	Eastern	32	46.4%	1.4	30	6.7%
	Northwest	18	26.1%	1.1	9	100%
	Southeast	1	1.4%	0.2	4	-75%
	Southwest	10	14.5%	0.9	8	25%
	State of Missouri	69	100%	1.1	57	21.1%

[1]Socio-demographic Category Information is missing for some cases. N/A=No computation made.
Data Source: Missouri Health Information Surveillance System (WebSury).

Clinical isolates of *Legionella* species identified by laboratories are not required to be submitted to the Missouri State Public Health Laboratory for confirmation or identification. There was one outbreak of legionellosis in Missouri for 2012, but this outbreak accounted for only three laboratory confirmed cases with an identifiable epidemiological linkage to the same Missouri lodging facility within a six-week time period. Only two of the cases were Missouri residents. Each case reported exposure to the same hot tub at the lodging facility which was later determined to have deficiencies in cleaning and maintenance. Hot tubs have been identified as a common risk factor associated with previous outbreaks. After control measures were implemented no further cases were identified.

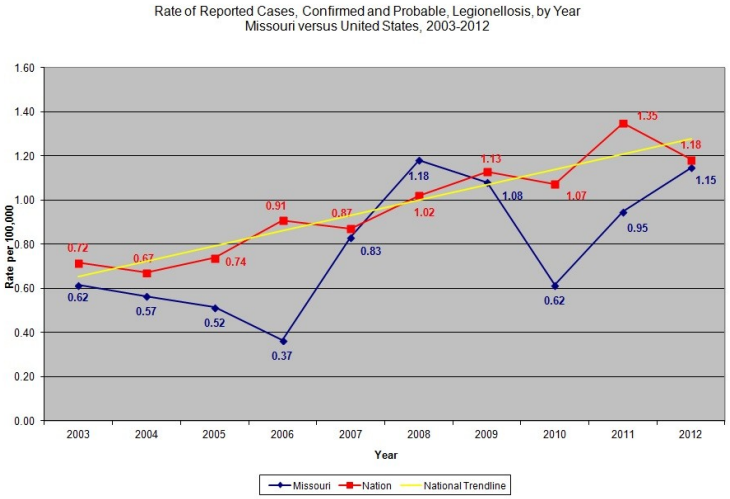
Determining the source(s) of non-outbreak related *Legionella* infections is difficult because *Legionella* bacteria can be found naturally in the environment. Similarly, not all outbreak investigations are successful in clearly identifying the source of infection. Outbreaks of travel-associated legionellosis are infrequently identified, even though more than 20% of all cases (per CDC) are thought to be associated with recent travel. In 2004 alone, CDC was contacted regarding over 150 cases of confirmed legionellosis among travelers. Many of these cases occurred among cruise ship passengers or persons staying overnight in large hotels. Like other travel-related infectious diseases, the identification of any given outbreak is hindered by the difficulties inherent in detecting clusters of infections among persons who have recently dispersed from a point source and returned to their home states.

Challenges that have been acknowledged nationally include the timely reporting of travel-associated cases with complete travel information which could allow for early identification and control of known sources of infection. In addition, developing effective education methods and materials to prevent legionellosis is an ongoing challenge.

Comparison to National Data: In 2012, the statewide IR was 1.15 cases per 100,000 as compared to the national IR of 1.18 cases per 100,000 population. The legionellosis IR per 100,000 population for Missouri ranged from 0.37 to 1.18 cases during the years 2003 to 2012, as compared to 0.67 to 1.35 cases per 100,000 population nationally for the same period. The decline in the annual incidence rate of legionellosis cases in Missouri from 2009 to 2010, was in contrast to the increase observed nationally. However, in 2012 Missouri's IR has again reached levels previously observed in 2008 and is almost at the national IR. Nationally, the IR of legionellosis decreased slightly from 2011 to 2012, but a general increasing trend in disease began in 2003.

Section A - Communicable Disease Surveillance

Legionellosis-continued



Factors contributing to this increase are believed to be a true increase in disease transmission, greater use of diagnostic testing, and increased reporting. Which may in part, be due to an increasing population of older persons along with an increasing population of persons at high risk of infection such as the immunosuppressed.

Each year in the U.S., an estimated 8,000 to 18,000 people are hospitalized with Legionnaires' disease, while 5-30% of the illnesses will be fatal. However, only about 3,000 cases are reported to CDC each year. More than 20% of all cases are thought to be associated with recent travel. Outbreaks of Legionnaires' disease among travelers can be difficult to detect because of the low attack rate, long incubation period, and the dispersal of persons from the source of the outbreak.

Timely reporting of travel-associated cases could allow early identification and control of known sources of infection. The collection of accurate exposure information from the ill persons or their surrogates remains an integral component of public health surveillance.

Prevention: *Legionella* bacteria are not spread from person-to-person and there is no vaccine currently available. The key to preventing legionellosis is maintenance of the water systems in which *Legionella* grow, including drinking water systems, hot tubs, decorative fountains, and cooling towers.

Guidelines for appropriate water temperatures and chemical treatment of water for legionellosis prevention can be found on CDC's website at: http://www.cdc.gov/legionella/about/prevention.html. In addition, persons at increased risk of infection may also choose to avoid high-risk exposures such as being in or near a hot tub.

Additional Website Resources:

CDC Health Topics

CDIRM

Section A - Communicable Disease Surveillance

Pertussis

2012 Case Total	**815**	**2012 Incidence Rate**	**13.6 per 100,000**
2011 Case Total	**438**	**2011 Incidence Rate**	**7.3 per 100,000**

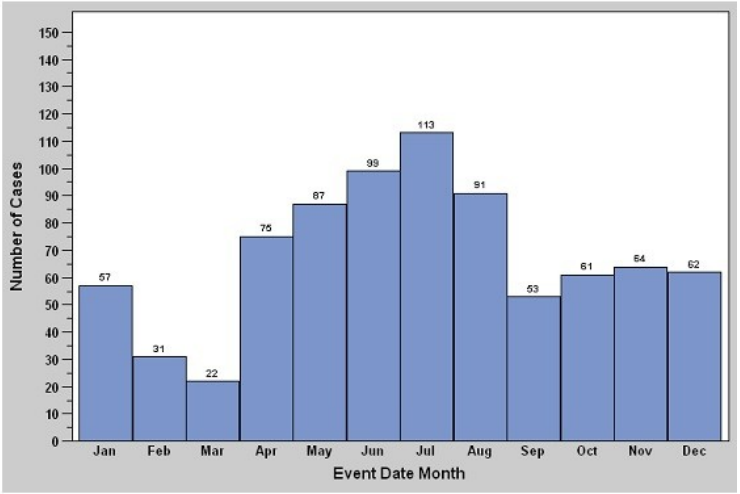
Click to View

Pertussis is a highly communicable, vaccine-preventable disease that affects the respiratory tract. The illness is caused by *Bordetella pertussis* (*B. pertussis*) bacteria, for which humans are the only known natural reservoir. In classic cases, pertussis begins with a runny nose, mild cough, and low-grade fever (the catarrhal stage), which progresses to paroxysmal spasms of severe coughing, inspirational "whooping", and post-tussive vomiting. The duration of cough for classic pertussis is 6 to10 weeks. Approximately half of adolescents with pertussis cough for 10 weeks or longer. Pertussis may also present as a mild to moderate cough illness in people who are partially immune, which makes diagnosis more elusive to clinicians and can result in unrecognized cases. Pertussis is primarily a toxin-mediated disease. The bacteria attach to the cilia of the respiratory epithelial cells, produce toxins that paralyze the cilia, and cause inflammation of the respiratory tract, which interferes with the clearing of pulmonary secretions.

Bordetella parapertussis which causes less severe pertussis-like illness accounts for 5% of isolates of *Bordetella* spp. in the U.S. *Bordetella holmesii* (*B .holmesii*) is being increasingly recognized as a cause of pertussis-like illness worldwide. In 210-2011, *B .holmesii* caused large community outbreak of pertussis-like illness in Ohio. This report only addresses *B. pertussis*.

In the U.S., most hospitalizations and nearly all deaths from pertussis occur in infants under six months of age. Complications are most common in infants and young children, and include pneumonia, hypoxia, apnea, seizures, encephalopathy, and malnutrition. Sudden infant death syndrome (SIDS) can be the manifestation of pertussis in young infants. In adults and adolescents protracted coughing episodes may also cause sleep disturbance, urinary incontinence, subconjunctival hemorrhaging, rib fractures, or other sequelae. Pertussis is transmitted through direct contact with discharges from respiratory mucous membranes of infected persons or via aerosolized droplets from coughing and sneezing. The incubation period ranges from 5-21 days, and is usually 7-10 days.

Reported Number of Pertussis Cases, Confirmed and Probable
By Event Date Month, Missouri, 2012



Around 80% of susceptible household contacts of pertussis patients develop the disease. Transmission also occurs in child care settings, schools, clinics, and institutions including hospitals. Pertussis vaccination reduces transmissibility. Children who are too young to be fully vaccinated or who have not completed the primary vaccination series are at highest risk for severe illness. For more information on pertussis visit: http://www.cdc.gov/pertussis/.

Missouri Incidence: In 2012, pertussis increased by 45.3% when compared to the five-year median data from 2007-2011. In addition, a seasonal trend for pertussis was noted in Missouri, with over half (57.1%) of the cases, occurring from

Section A - Communicable Disease Surveillance

Pertussis - continued

April through August (n=465).

Persons with pertussis ranged in age from 2 weeks old to 87 years, with a median age of 10 years. Over 70% of the reported cases were among children age 14 years or less. The highest age specific incidence rates (IR) of 126.2 cases per 100,000 population occurred among children less than 1 year of age followed by 46.3 cases per 100,000 population for children 5-14 years of age. Females accounted for 57.4% of the cases and the race specific IR was higher for Other races with a 13.1 cases per 100,000 population (n=21). The highest proportion of cases occurred in the Eastern district (50.3%, n=410) resulting in an IR of 18.3 cases per 100,000 population. However, the highest district IR of 19 cases per 100,000 population (n=299) was observed in the Northwest district. The district specific IR and case counts for the remaining districts was Central 6.4 cases per 100,000 population (n=43), Southeast 4.4 cases per 100,000 population (n=21) and Southwest 4 cases per 100,000 population (n=42).

Pertussis
Comparative Statistics by Socio-demographic Category, Missouri 2012[1]

		Case Count	Percent of Total	Rate per 100,000	5-Year Median	Percent Change from Median
Sex	Female	468	57.4%	15.3	311	50.5%
	Male	347	42.6%	11.8	250	38.8%
Race	Black	91	11.2%	12.3	26	250%
	Other	21	2.6%	13.1	3	600%
	Unknown	91	11.2%	N/A	N/A	N/A
	White	612	75.1%	12	323	89.5%
Age Group	00 to <01	96	11.8%	126.2	53	81.1%
	01 to 04	120	14.7%	38.9	76	57.9%
	05 to 14	364	44.7%	46.3	293	24.2%
	15 to 24	88	10.8%	10.5	30	193.3%
	25 to 39	58	7.1%	5.1	34	70.6%
	40 to 64	70	8.6%	3.5	41	70.7%
	65 and older	17	2.1%	2	10	70%
	Unknown	2	0.2%	N/A	N/A	N/A
District	Central	43	5.3%	6.4	43	0%
	Eastern	410	50.3%	18.3	339	20.9%
	Northwest	299	36.7%	19	48	522.9%
	Southeast	21	2.6%	4.4	36	-41.7%
	Southwest	42	5.2%	4	21	100%
	State of Missouri	815	100%	13.6	561	45.3%

[1]Socio-demographic Category Information is missing for some cases. N/A=No computation made.
Data Source: Missouri Health Information Surveillance System (WebSurv).

Forty-one cases (5%) were hospitalized[¥]. Seventy-six percent of cases who required hospitalization[¥] were less than one year of age. No pertussis-associated deaths[¥] were reported in 2012.

Clinical isolates of *B. pertussis* identified by laboratories are required to be submitted to the Missouri State Public Health Laboratory (MSPHL) for confirmation by polymerase chain reaction (PCR) and culture. The MSPHL received 51.5% (n=305) of the reported confirmed and probable cases (178 cases;136 confirmed and 42 probable meet case definition in the absence of laboratory confirmation; an additional 44 cases only had a serology test for pertussis performed; and an additional Missouri case was reported through another state public health laboratory). The denominator did not include the 223 cases mentioned above (n=592).

The immunization compliance of children 19 months of age through kindergarten entry is monitored in Missouri. In 2012, 92.4% of the children reviewed had been adequately immunized with DTaP [diphtheria, tetanus, and pertussis vaccine; children reviewed=20,313]. There were two school-associated outbreaks reported in 2012. The outbreaks were in Eastern and Central districts. The outbreaks were responsible for 2.6% (n=21) of the cases, but not the entire 45.3% increase above the five-year median that was observed. The reason for the increase may be due to a combination of factors; increased awareness, greater access to and improved diagnostic tests, better reporting, more circulation of the bacteria, waning immunity, the challenge of controlling a highly contagious and often under-recognized disease in non-infants, the fact that the vaccine efficacy ranges from 80-90%, or to other unknown factors. When it comes to waning immunity, it seems that the acellular pertussis vaccine (DTaP) we use now may not protect for as long as the whole cell vaccine (DTP) used previously.

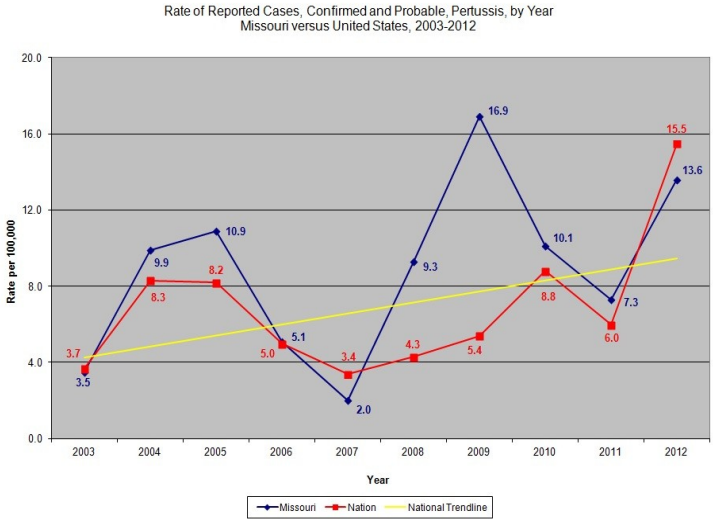
Challenges: There are many challenges associated with pertussis. Pertussis is communicable as it spreads easily from person-to-person through coughing and sneezing. A person with pertussis can infect up to 12 to 15 other people. That's why being up-to-date with pertussis vaccines and practicing good cough etiquette

Section A - Communicable Disease Surveillance

Pertussis - continued.

are so important. In addition, many infants who get pertussis are infected by older siblings, parents or caregivers who might not know they have the disease. Pertussis was never eliminated from the U.S. like measles or polio, so there's always the chance for it to be introduced into a community. Multiple types or strains of pertussis bacteria can be found causing disease at any given time. If pertussis is circulating in the community, even a fully vaccinated person of any age could become infected and develop diseases. However the diseases is typically less severe in persons who were previously vaccinated. Developing effective education methods and materials to prevent pertussis is an ongoing public health challenge.

Comparison with National Data: In 2012, the statewide IR was 13.6 cases per 100,000 as compared to the national IR of 15.5 cases per 100,000 population. The pertussis IR per 100,000 population for Missouri ranged from 2.0 to 16.9 cases during the years 2003 to 2012, as compared to 3.4 to 15.5 cases per 100,000 nationally for the same period. Since the early 1980s, nationally there has been an overall upward trend in reported pertussis cases. A similar trend has also been observed in Missouri. For the past 8 years, the annual IR for pertussis in Missouri has consistently exceeded the national IR, with the exception of 2007 and 2012. The possible causes for this increase were discussed above.



Approximately half of infants younger than 1 year of age who get pertussis are hospitalized. The younger the infant, the more likely treatment will include hospitalization. Of those infants who are hospitalized with pertussis approximately 67% will have apnea; 23% get pneumonia; 1.6% will have convulsions; 0.4% will have encephalopathy; and 1.6% will die. It is important we continue the diligent surveillance of pertussis to promptly identify cases and implement appropriate public health control measures (in certain circumstances, people in close contact with pertussis should receive antibiotics to prevent them from getting the disease). In addition, surveillance allows us to determine the incidence and epidemiologic characteristics of pertussis in Missouri and monitor the impact of vaccination programs. The collection of accurate exposure information from the ill persons or their surrogates remains an integral component of public health surveillance.

Prevention: The best way to prevent pertussis is keeping up-to-date with recommended pertussis vaccines. Vaccination of pregnant women with Tdap is especially important to help protect infants. Infants should also receive the appropriate pertussis containing vaccines on schedule. In addition, it is important to surround infants and other people at high risk for pertussis complications with family members and care givers who are vaccinated against pertussis. Many infants who get pertussis are infected by older siblings, parents or caregivers. Beginning in the 2010-2011 school year, 8th grade students in Missouri are required to receive a booster dose of Tdap. Many other states have implemented similar strategies. Other preventive measures to reduce the risk of pertussis include the education and implementation of good hand washing and appropriate cough/sneeze etiquette. For additional prevention information visit: http://www.cdc.gov/pertussis/about/prevention.html.

Additional Website Resources:

CDC Health Topics CDIRM

Section A - Communicable Disease Surveillance

Rabies, Animal and Human
Rabies Post-Exposure Prophylaxis (PEP) Initiated

All Species Map
Wild Species Map
Domesticated Species Map
PEP Map

Rabies is a fatal viral illness that affects only mammals. Although there is great variability in the susceptibility of various species to infection with this virus and subsequent manifestation of disease, any mammal may be infected with the rabies virus and serve as a source of infection for other mammals. Virus is typically present in the saliva of clinically ill mammals and is most often transmitted through a bite. After entering the central nervous system of the next host, the virus causes an acute, invariably progressive encephalomyelitis that is almost always fatal. The incubation period in animals and humans is usually several weeks to months, but may range from days to years. Rabies has the highest case fatality ratio of any infectious disease if prompt intervention is not initiated in the case of humans; there is no post-exposure intervention for animals. Laboratory testing for rabies is useful for confirmation of the virus' presence in certain species and geographic locations, and for determination of the need to administer rabies prophylaxis in cases of human exposure to a potentially rabid animal. The only reliable method of testing animals for the presence of rabies virus is through laboratory analysis of brain tissue. Public health surveillance for this disease in domestic and wild animal populations is a valuable tool in the prevention of human rabies cases.

Rabies (Animal)

During 2012, 28 cases of animal rabies comprised of 16 bats and 12 skunks were detected in Missouri, compared to 29 cases the previous year, representing a 3% decrease. During the five-year period 2007 through 2011, an annual average of 2,808 specimens were submitted for testing with an average of close to 52 rabid animals detected each year during that period. The annual number of rabies cases during this five-year period ranged from a low of 29 cases in 2011 to a high of 65 cases in 2009. The drop in the number of rabid animals detected in 2012 (28 cases) and 2011 (29 cases) compared to previous years was in part due to fewer specimen submissions in 2012 (1,842 submissions) and 2011 (1,868 submissions). Fewer specimens were submitted in those two years compared to the earlier period due to increased emphasis on ensuring that specimens were submitted only in those situations where a public health or medical decision needed to be made (rather than, for example, submission of specimens for purely surveillance purposes). This approach helped to ensure the effective utilization of laboratory resources. The drop in cases in 2012 was also due to a decrease in the percent of specimens that tested positive. In 2012, 28 (2%) positive animals were detected out of 1,842 submissions, compared to a total of 259 (1.8%) rabid animals detected out of 14,042 total submissions for the five-year period of 2007 – 2011.

Animal Rabies, by Species, Missouri 2012

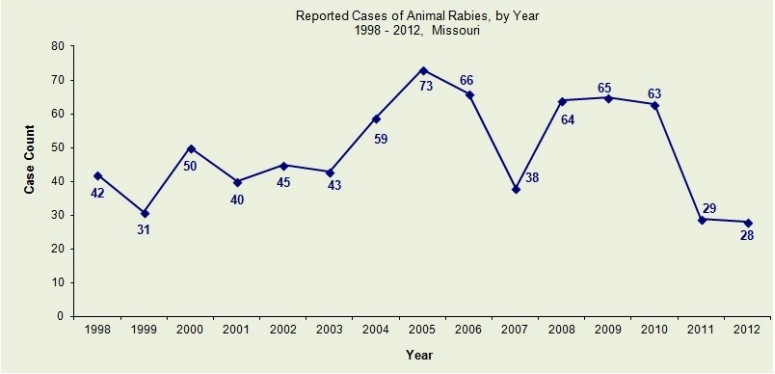
Species	Number Examined	Number Positive	Percent Positive
Bat	565	16	3%
Cat	439	0	0%
Cow	30	0	0%
Dog	565	0	0%
Ferret	1	0	0%
Fox	7	0	0%
Horse	19	0	0%
Other Domestic	9	0	0%
Other Wild	34	0	0%
Raccoon	82	0	0%
Rodent/Rabbit	49	0	0%
Skunk	42	12	29%
Total	1,842	28	2%

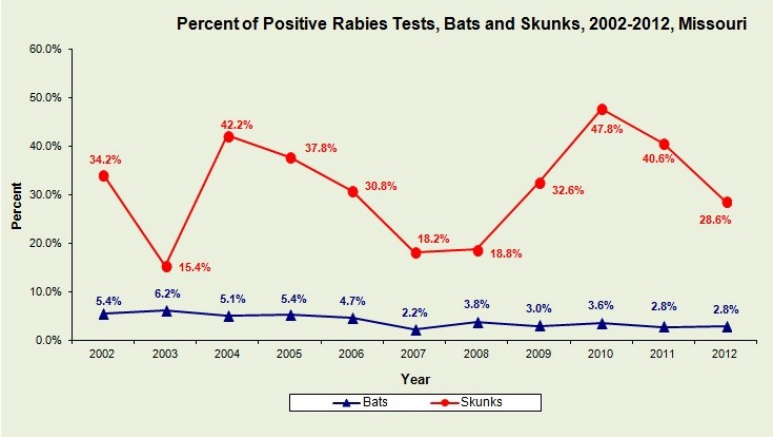
The number of rabid animals detected each year varies according to several parameters, including awareness on the part of the public and health community regarding this disease, the willingness and ability

Section A - Communicable Disease Surveillance

Rabies, Animal and Human; Rabies Post-Exposure Prophylaxis (PEP) Initiated - continued

of agencies and individuals to submit specimens for testing, competing interests, financial constraints and, of course, the actual incidence of rabies in wildlife. As with most diseases having wild animals as the reservoir, the number of rabies cases goes through a cycle of "troughs" and "peaks" over a period of several years. Peaks usually correspond to the infection of large numbers of immunologically naïve animals that result when populations increase due to favorable environmental conditions, decreased human intervention (hunting, trapping, eradicating), and other factors. Troughs result as transmission rates decrease among rabies die-off survivors, which tend to have a wider degree of geographic dispersion and perhaps some level of immunity. Survivors eventually reproduce, providing a new population of vulnerable animals through which the rabies virus can spread and which results in the next peak of the cycle. As the number of rabid reservoir animals (which are bats and skunks, in Missouri) increases, so does the chance of "spill-over" into other species, both wild and domestic. The skunk variant of the rabies virus is transmitted very effectively from skunk-to-skunk and can also be readily transmitted to other wild and domestic animals. However, when the skunk variant is transmitted to a non-reservoir species (for example, a coyote), the variant is not as easily transmitted from the non-reservoir animal to other animals. In this manner, the non-reservoir species is almost a dead-end host. The same epidemiologic relationship is true for bats (the other reservoir species in Missouri), bat variants of the rabies virus, and non-reservoir species. Finally, the percentage of animals that test positive for rabies presumably increases as the natural incidence increases (and vice versa), but there is little predictive value to this relationship since the exact correlation cannot be determined with existing data.



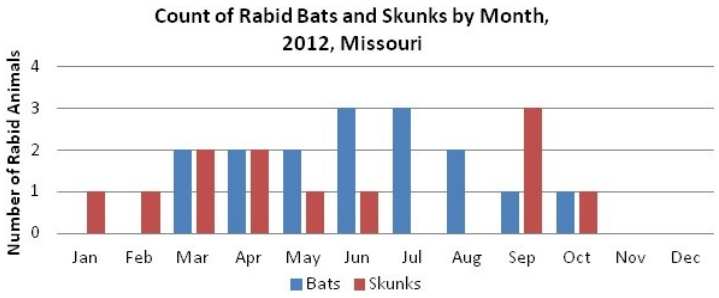


The Missouri State Public Health Laboratory (SPHL) is the only facility in Missouri that tests animals for rabies. Specimens are tested only when there is known exposure or "significant potential exposure" of any of the following to a possibly infected animal: humans, pets, domesticated animals (e.g., horses, livestock), and exotic or non-native animal species maintained for husbandry purposes or in zoos. A DHSS policy letter with criteria for specimen submission may be found at http://www.health.mo.gov/lab/pdf/rabies_testing_policy.pdf. The policy letter specifically addresses submission of bat specimens, and gives criteria for when they should and should not be submitted for rabies testing. Instructions for submitting specimens and complete animal rabies testing information (including a list of courier pick-up sites) may be found at http://www.health.mo.gov/lab/rabies.php.

Section A - Communicable Disease Surveillance

Rabies, Animal and Human; Rabies Post-Exposure Prophylaxis (PEP) Initiated - continued

In 2012, specimens were submitted from all regions of the state, with rabid animals detected in 14 counties plus St. Louis City. The first rabid animal detected was a skunk from Reynolds County on January 26th, while the last animal detected was a skunk from Dent County on October 10th. One or more rabid animals were detected each month from January through October; none were detected in November and December.



Rabies in bats occurs sporadically throughout Missouri. It is estimated that less than 0.5% of bats in the wild are rabid, and only 2.8% of the "high risk" bats (e.g., found sick, dead, or exhibiting unusual behavior) tested positive during 2012. The big brown bat (*Eptesicus fuscus*), eastern red bat (*Lasiurus borealis*), and the tri-colored bat (*Perimyotis subflavus*) formerly known as the eastern pipistrelle bat account for about 95% of the species of bats found to be rabid in Missouri. While rabid skunks can be found anywhere in the state, most cases are usually confined to roughly the southern one-half of Missouri. Both the north-central and south-central variants of the skunk rabies virus are found in rabid skunks in Missouri. The percent of skunks that test positive for rabies is much more variable than the percent of bats testing positive, with evidence of rabies infection found in 28.6% of the skunks submitted in 2012. A county is placed under a "rabies alert" when a positive domestic animal is detected in that county or when the threshold level for rabid wild animals is exceeded. No counties were placed under alert in 2012.

Rabies (Human)

No human rabies deaths were recorded in Missouri in 2012. The last known human death from rabies in this state occurred in 2008 and involved a man who was bitten by a bat and, although aware of the bite, did not seek medical care or report the incident to public health officials until he was symptomatic. A complete description of this case can be found in the *Morbidity and Mortality Weekly Report*, Centers for Disease Control and Prevention (CDC), Vol. 58/No. 43/November 6, 2009 (http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5843a3.htm).

Rabies Postexposure Prophylaxis (Initiated)

"Rabies postexposure prophylaxis (initiated)" (RPEP), became a reportable condition on August 31, 2006. This condition was reported 370 times during 2012, which was almost 43 percent above the five-year median of 259 reports. Males accounted for 187 (50.5%) of the 370 reports, females accounted for 181 (48.9%) of the reports, while the gender was unknown in 2 (0.5%) of the reports. The number of reports and percent by age group were as follows: Less than 1 year – 4 (1.1%); 1 to 4 years – 17 (4.6%); 5 to 14 years – 62 (16.8%); 15 to 24 years – 55 (14.9%); 25 to 39 years – 76 (20.5%);

Rabies Post Exposure Prophylaxis
Comparative Statistics by Socio-demographic Category, Missouri 2012[1]

		Case Count	Percent of Total	Rate per 100,000	5-Year Median	Percent Change from Median
Sex	Female	187	50.5%	6.1	136	37.5%
	Male	181	48.9%	6.1	122	48.4%
	Unknown	2	0.5%	N/A	0	N/A
Race	Black	11	3%	1.5	8	37.5%
	Other	7	1.9%	4.4	2	250%
	Unknown	72	19.5%	N/A	66	9.1%
	White	280	75.7%	5.5	158	77.2%
Age Group	00 to <01	4	1.1%	5.3	3	33.3%
	01 to 04	17	4.6%	5.5	19	-10.5%
	05 to 14	62	16.8%	7.9	46	34.8%
	15 to 24	55	14.9%	6.6	42	31%
	25 to 39	76	20.5%	6.7	58	31%
	40 to 64	115	31.1%	5.7	67	71.6%
	65 and older	33	8.9%	3.9	17	94.1%
	Unknown	8	2.2%	N/A	3	166.7%
District	Central	59	15.9%	8.8	70	-15.7%
	Eastern	141	38.1%	6.3	120	17.5%
	Northwest	33	8.9%	2.1	2	1550%
	Southeast	40	10.8%	8.4	13	207.7%
	Southwest	97	26.2%	9.2	42	131%
	State of Missouri	370	100%	6.2	259	42.9%

[1]Socio-demographic Category Information is missing for some cases. N/A=No computation made.
Data Source: Missouri Health Information Surveillance System (WebSury).

Section A - Communicable Disease Surveillance

Rabies, Animal and Human; Rabies Post-Exposure Prophylaxis (PEP) Initiated - continued

40 to 64 years – 115 (31.1%); 65 and older – 33 (8.9%); age unknown – 8 (2.2%). CDC estimates that about 40,000 persons receive RPEP in the United States each year. Missourians no doubt account for a significant portion of these cases due to the endemicity of rabies in wild animals in the state and the interaction of people and their pets with these animals. The expense of providing RPEP remains high and variable, with an estimated cost of almost $5,500 per patient.

Administration of RPEP is a medical urgency, not a medical emergency. Physicians should evaluate each possible exposure to rabies and, if necessary, consult with local or state public health officials regarding the need for rabies prophylaxis. Factors that should be considered before specific antirabies postexposure prophylaxis is initiated include type of exposure (bite, nonbite), epidemiology of rabies in animal species involved, circumstances of bite incident, vaccination status of exposing animal, and availability of animal for quarantine or testing.

If exposed to rabies, previously vaccinated persons should receive two intramuscular doses (1.0 ml each) of vaccine, one immediately and one three days later. Previously vaccinated persons are those who have ever completed one of the recommended preexposure or postexposure regimens of cell tissue culture vaccine, or those who received another vaccine and had a documented rabies antibody titer. Human rabies immunoglobulin (HRIG) is unnecessary and should not be administered to previously vaccinated persons because the administration of passive antibody might inhibit the relative strength or rapidity of an expected anamnestic response.

Persons who have not been previously vaccinated should receive both vaccine and HRIG. The combination of HRIG and vaccine is recommended for both bite and nonbite exposures, regardless of the interval between exposure and initiation of treatment. A regimen of four 1-ml doses of vaccine should be administered intramuscularly. The first dose of the four-dose course should be administered as soon as possible after exposure (day 0). Additional doses should be administered on days 3, 7, and 14 after the first vaccination. Immunosuppressed individuals should receive a fifth dose of vaccine on day 28, with the awareness that the immune response may still be inadequate. A patient who fails to develop an antibody response should be managed in consultation with their physician and appropriate public health officials. As noted above, in addition to bite exposures, HRIG is indicated for non-bite exposures, such as saliva from an infectious animal that is splashed into a person's eyes, nose, or mouth or which comes in contact with a fresh open cut, abrasion, or other wound. HRIG is also indicated in those situations where a bite from an infected animal may not be apparent but is presumed to have occurred (such as a possible bite from a rabid bat) and for which RPEP is being administered. HRIG is administered only once (i.e., at the beginning of RPEP) to previously unvaccinated persons to provide immediate, passive, rabies virus neutralizing antibody coverage until the patient responds to rabies vaccination by actively producing antibodies. If HRIG was not administered when vaccination was begun (i.e., day 0), it can be administered up to and including day seven of the RPEP series. Beyond the seventh day, HRIG is not indicated because an antibody response to rabies vaccine is presumed to have occurred. Because HRIG can partially suppress active production of antibody, the dose administered should not exceed the recommended dose. The recommended dose of HRIG is 20 IU/kg body weight. This formula is applicable to all age groups, including children. If anatomically feasible, the full dose of HRIG should be thoroughly infiltrated in the area around and into the wounds. Any remaining volume should be injected IM at a site distant from vaccine administration.

Section A - Communicable Disease Surveillance

Rabies, Animal and Human; Rabies Post-Exposure Prophylaxis (PEP) Initiated - continued

This recommendation for HRIG administration is based on reports of rare failures of RPEP when less than the full amount of HRIG was infiltrated at the exposure site. HRIG should never be administered in the same syringe or in the same anatomical site as the first vaccine dose. However, subsequent doses of vaccine in the 4-dose series can be administered in the same anatomic location where the HRIG dose was administered, if this is the preferable site for vaccine administration (i.e., deltoid for adults or anterolateral thigh for infants and small children).

The following measures should be employed to help prevent rabies in the community:

- Ensure dogs, cats, and ferrets are vaccinated against rabies; vaccinations are also available for horses, cattle, and sheep.
- Keep pets under control; do not allow them to run loose.
- Avoid contact with stray pets and wild animals.
- Report stray pets to an animal control officer as well as wild animals that are acting strangely.
- If bitten by an animal, wash the wound with soap and water for 10 to 15 minutes and consult a physician to determine if RPEP, tetanus booster, and antibiotics are needed.
- Have pets spayed or neutered, since pets that are fixed are less likely to stray from home and produce unwanted litters.
- Pets should not be handled without gloves or other protection directly after they have been exposed to wildlife since they might have saliva on their fur from a rabies-infected animal.

Additional Website Resources:

CDC Health Topics

CDIRM

Section A - Communicable Disease Surveillance

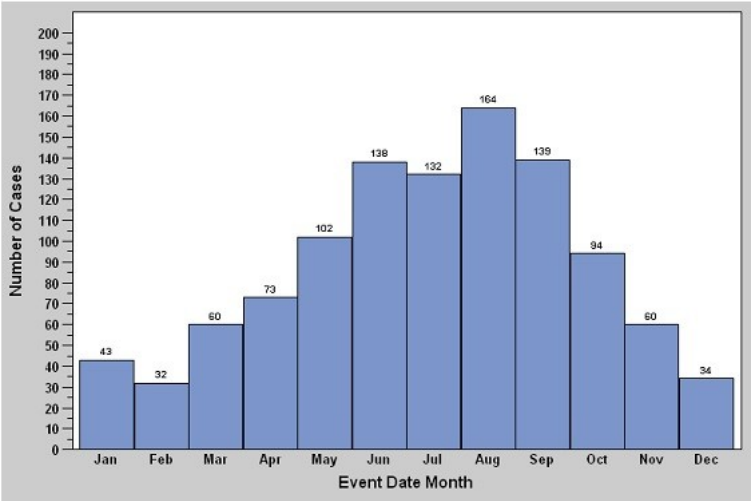
Salmonellosis

2012 Case Total 1,071 **2012 Incidence Rate 17.8 per 100,000**
2011 Case Total 900 **2011 Incidence Rate 15.0 per 100,000**

Click to View

Salmonellosis is an infection with bacteria called *Salmonella*. People get salmonellosis by ingesting contaminated food, water, or contact with infected animals. Salmonellosis affects all age groups. Most persons infected with *Salmonella* develop diarrhea, fever, and abdominal cramps 12 to 72 hours after infection. The illness usually lasts 4 to 7 days, and most persons recover without treatment. However, in some persons, the diarrhea may be so severe that the patient needs to be hospitalized. In these patients, the *Salmonella* infection may spread from the intestines to the blood stream, and then to other body sites and can cause death unless the person is treated promptly with antibiotics. The elderly, infants, and those with impaired immune systems are more likely to have a severe illness or complicated disease. Persons with diarrhea usually recover completely, although it may be several months before their bowel habits are entirely normal. A small number of persons with *Salmonella* develop pain in their joints, irritation of the eyes, and painful urination. This is called reactive arthritis. It can last for months or years, and can lead to chronic arthritis which is difficult to treat. For more information on salmonellosis visit: http://www.cdc.gov/salmonella/.

Reported Number of Salmonellosis Cases, Confirmed and Probable
By Event Date Month, Missouri, 2012



Missouri Incidence: In 2012, salmonellosis increased by 40.2% when compared to the five-year median data from 2007-2011. In addition, a seasonal trend for salmonellosis was noted in Missouri, with over half (63%) of the cases, occurring in the warmer months of May through September (n=675).

Persons with salmonellosis ranged in age from 4 days to 95 years, with a median age of 32 years. The highest age specific incidence rates (IR) per 100,000 population occurred among children less than 1 year of age which was 96 cases per 100,000 population; followed by children 1-4 years of age which was 43.8 per 100,000 population. The highest proportion of cases occurred in the Eastern district 31.7% (n=340) resulting in an IR of 15.2 per 100,000 population. However, the highest district IR occurred in Southeast which was 37.2 per 100,000 population (n=177).

Salmonellosis
Comparative Statistics by Socio-demographic Category, Missouri 2012[1]

		Case Count	Percent of Total	Rate per 100,000	5-Year Median	Percent Change from Median
Sex	Female	574	53.6%	18.7	402	42.8%
	Male	495	46.2%	16.8	362	36.7%
	Unknown	2	0.2%	N/A	N/A	N/A
Race	Black	81	7.6%	10.9	63	28.6%
	Other	20	1.9%	12.5	7	185.7%
	Unknown	225	21%	N/A	N/A	N/A
	White	745	69.6%	14.6	447	66.7%
Age Group	00 to <01	73	6.8%	96.0	65	12.3%
	01 to 04	135	12.6%	43.8	103	31.1%
	05 to 14	138	12.9%	17.6	85	62.4%
	15 to 24	104	9.7%	12.5	95	9.5%
	25 to 39	166	15.5%	14.5	108	53.7%
	40 to 64	286	26.7%	14.2	192	49%
	65 and older	165	15.4%	19.3	120	37.5%
	Unknown	4	0.4%	N/A	N/A	N/A
District	Central	146	13.6%	21.8	81	80.2%
	Eastern	340	31.7%	15.2	281	21%
	Northwest	245	22.9%	15.6	190	28.9%
	Southeast	177	16.5%	37.2	104	70.2%
	Southwest	163	15.2%	15.4	121	34.7%
	State of Missouri	1,071	100%	17.8	764	40.2%

[1]Socio-demographic Category Information is missing for some cases. N/A=No computation made.
Data Source: Missouri Health Information Surveillance System (WebSurv).

Section A - Communicable Disease Surveillance

Salmonellosis-continued

Central was 21.8 per 100,000 population (n=146), Northwest was 15.6 per 100,000 population (n=245) and Southwest was 15.4 per 100,000 population (n=163).

Females accounted for 53.6% of the cases, 22.8% (n=244) of the cases were hospitalized and there were 3 deaths[¥] in 2012. The race specific IR was higher for whites with a 14.6 per 100,000 population (n=745). Missouri also reported three cases of *Salmonella* Typhi (Typhoid Fever) for 2012 for an IR of 0.05 per 100,000 population. The cases range in age from 2 to 39 years of age. Two of the three cases were male. All of the cases reported foreign travel prior to onset of illness.

Clinical isolates of *Salmonella* species identified by laboratories are required to be submitted to the Missouri State Public Health Laboratory (MSPHL) for confirmation, serogroup identification, and analysis by pulsed-field gel electrophoresis (PFGE). The MSPHL confirmed and serogrouped 995 (97.2%) of the (1,024) confirmed *Salmonella* cases. Seventy-nine different serogroups were identified, with the top five being *S.* Typhimurium (19.6%, n = 195), *S.* Enteriditis (19.0%, n=189,), *S.* Newport (13.3%, n=132), *S.* I 4,5,12:i:- (5.9%, n=59) and S. Thompson (4.7%, n=47) of typed isolates. Serotyping can be a very useful tool for recognition of outbreaks. The Missouri Department of Health and Senior Services (MDHSS) also utilizes PFGE to detect clusters and/or outbreaks, both in Missouri and nationwide.

During 2012, Missouri reported nine *Salmonella* outbreaks. Eight were multistate outbreaks and one *S.* Muenchen outbreak associated with an overseas trip that occurred in July. The eight multistate outbreaks for which Missouri reported cases are: *S.* Bareilly infections associated with raw scraped ground tuna products; *S.* Montevideo infections associated with live poultry; *S.* Infantis infections associated with dry dog food; *S.* Typhimurium and *S.* Newport infections associated with cantaloupe; *S.* Bredeney associated with peanut butter; and *S.* Poona, *S.* Typhimurium and *S.* Pomona infections associated with exposure to small turtles.

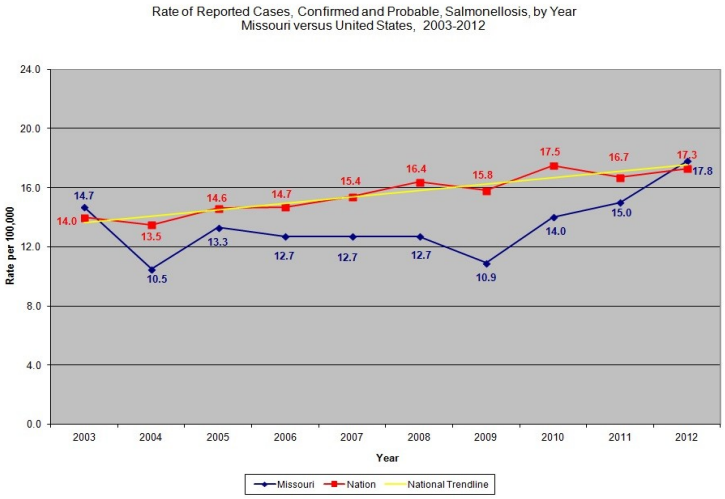
The afore mentioned outbreaks were responsible for 6.3% (n=68) of the cases, but not the entire 40.2% increase above the five-year median that was observed. The reason for the increase in Missouri is unknown. Determining the source of non-outbreak related *Salmonella* infections is difficult because *Salmonella* are ubiquitously present in the environment and can reside in the gastrointestinal tracts of animals. Similarly, not all outbreak investigations are successful in clearly identifying the source of infection. Most products contaminated with *Salmonella* do not taste or look any different than normal and there are inherit delays in reporting that can impact the investigation.

The Centers for Disease Control and Prevention reported other *Salmonella* outbreaks in the U.S., of which Missouri did not have any associated cases. These outbreaks include: *S.* Enteritidis associated with exposure at Restaurant Chain A; *S.* Infantis, *S.* Newport, *S.* Lille and *S.* Hadar associated with live poultry; *S.* Enteritidis infections caused by ground beef; *S.* Braenderup associated with mangoes; *S.* Sandiego infections associated with exposure to small turtles; and *S.* Typhimurium associated with hedgehogs.

Challenges that have been acknowledged nationally include: identifying unrecognized major sources of *Salmonella* infections; determining the sources of *Salmonella* infections in infants; preventing contamination of vegetables with manure from concentrated animal feeding operations; preventing further emergence of highly resistant *Salmonella* strains; controlling *Salmonella* Enteritidis infections through changes in the egg industry; education of food service workers and consumers; and developing effective education methods and materials to prevent reptile-associated salmonellosis.

Section A - Communicable Disease Surveillance

Salmonellosis-continued



Comparison to National Data: In 2012, the statewide IR was 17.8 cases per 100,000 as compared to the national IR of 17.3 cases per 100,000 population. The salmonellosis IR per 100,000 population for Missouri ranged from 10.5 to 17.8 cases during the years 2003 to 2012, as compared to 13.5 to 17.3 cases per 100,000 population nationally for the same period. The national IR of reported salmonellosis has gradually increased over the past decade. The annual IR of reported salmonellosis in Missouri has steadily increased since 2010, and exceeded the national IR in 2012. Nationally, an increasing number of outbreaks associated with contact with animals (hedgehogs, live poultry, and small turtles) were investigated in 2012. The reason for the increase in Missouri is unknown. Approximately 42,000 cases of salmonellosis are reported in the U.S. annually. Because many milder cases are not diagnosed or reported, the actual number of infections may be 29 or more times greater. It is estimated that approximately 400 persons die each year with acute salmonellosis.

It is important that cases continue to be promptly reported and potential sources investigated. The collection of accurate exposure information from the ill persons or their surrogates remains an integral component of public health surveillance. Nationally, the rate of diagnosed infections in children >5 years old is higher than the rate in all other persons. Young children, the elderly, and the immunocompromised are the most likely to have severe infections or complicated disease. With the increased risk for children, it is important for parents and guardians to implement preventive measures to reduce the risk of disease. There is no vaccine to prevent salmonellosis.

Prevention: Cook poultry, ground beef, and eggs thoroughly. Do not eat or drink foods containing raw eggs, or raw (unpasteurized) milk. For additional information on foodborne illness visit the MDHSS website at: http://health.mo.gov/safety/foodsafety/pdf/befoodsafefactsheet.pdf.

- If you are served undercooked meat, poultry or eggs in a restaurant, do not hesitate to send it back to the kitchen for further cooking.
- Wash hands, kitchen work surfaces, and utensils with soap and water immediately after they have been in contact with raw meat or poultry.
- Be particularly careful with foods prepared for infants, the elderly, and the immunocompromised.
- Wash hands with soap after handling reptiles, birds, or baby chicks, and after contact with pet feces.
- Avoid direct or even indirect contact between reptiles (turtles, iguanas, other lizards, snakes) and infants or immunocompromised persons.
- Do not work with raw poultry or meat, and an infant (e.g., feed, change diaper) at the same time.
- Mother's milk is the safest food for young infants. Breastfeeding prevents salmonellosis and many other health problems.

Additional Website Resources:

CDC Health Topics CDIRM

For additional prevention information visit: http://www.cdc.gov/salmonella/general/prevention.html.

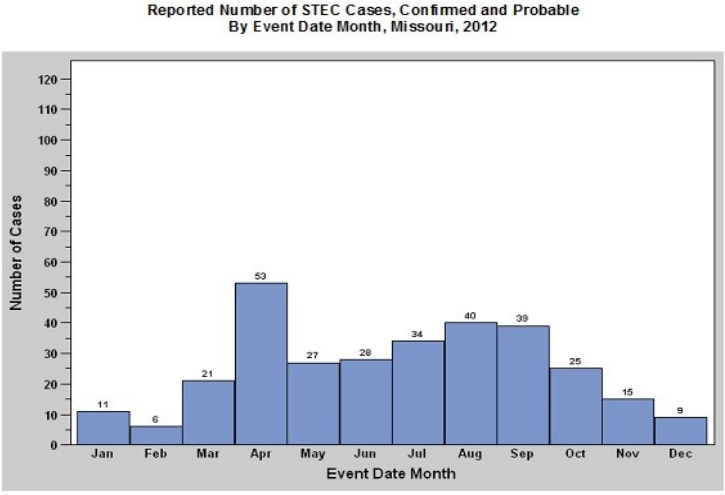
Section A - Communicable Disease Surveillance

Shiga toxin-producing *E. coli* (STEC) & Hemolytic Uremic Syndrome (HUS)

2012 STEC Case Total	**308**	**2012 Incidence Rate**	**5.1 per 100,000**
2011 STEC Case Total	**282**	**2011 Incidence Rate**	**4.7 per 100,000**
2012 HUS Case Total	**18**	**2012 Incidence Rate**	**0.3 per 100,000**
2011 HUS Case Total	**20**	**2011 Incidence Rate**	**0.3 per 100,000**

Escherichia coli (*E. coli*) are a diverse group of bacteria commonly found in the gut of warm blooded animals. Several types of *E. coli* exist as part of the normal flora of the human gut and most *E. coli* strains pose no harm to human health. However, several strains are known to cause disease in humans. Many of the disease causing strains of the bacteria produce toxins called Shiga-toxins, and are often collectively referred to as Shiga toxin-producing *E. coli* (STEC). The primary source of STEC is the intestinal tract of cattle; but it has also been isolated from other animals including sheep, goats, deer and others. Humans can also serve as a source of the bacteria with illnesses resulting from person-to-person transmission.

The primary STEC strain in the U.S. is *E. coli* O157:H7, which was first identified as a human pathogen in 1982. Other non-O157 STEC strains including O26, O45, O103, O111, O121, and O145 have also been identified as causes of diarrheal illness in the U.S. The illness caused by STEC includes diarrhea ranging from mild and non-bloody to stools that are virtually all blood. Other symptoms may include severe stomach cramps and vomiting. Symptoms typically begin within 3-4 days following exposure, but can range from 1 to 10 days. Most persons with a STEC associated illness will get better within 5 to 7 days. However, approximately 8% of all persons and up to 20% of children, diagnosed with *E. coli* O157:H7 infection will develop a potentially life-threatening complication called hemolytic uremic syndrome (HUS). The condition is often severe as half of persons with diarrhea associated HUS will require dialysis, and up to 5% will die. People of any age can become infected and develop a severe STEC associated illness. However, young children and the elderly are more likely to develop severe and potentially life threatening STEC associated illnesses including HUS. Non-O157:H7 STEC strains are less likely to cause severe illness; however, these infections can also result in severe complications including HUS. Although infection with STEC is the most frequently identified cause of HUS, other causes have increasingly been identified including *Streptococcus pneumoniae*.
For more information on STEC visit: http://www.cdc.gov/ecoli/general/.



Missouri Incidence: In 2012, STEC increased by 101.3% when compared to the five-year median data from 2007-2011. A seasonal trend for STEC was observed in Missouri, with 71.8 % of the cases occurring during the spring, summer and early fall months of April through September (n=221).

Persons with STEC ranged in age from 1 month to 96 years, with a median age of 19 years. The highest age specific incidence rates (IR) per 100,000 population occurred among children 1-4 years of age, which was 24.3 cases per 100,000

Section A - Communicable Disease Surveillance

STEC and HUS-continued

population; followed by children <1year old which was 14.5 cases per 100,000 population. The highest proportion of cases occurred in the Eastern district 33.8%, resulting in an IR of 4.7 cases per 100,000 population (n=104). However, the highest district specific IR occurred in Central which was 10.2 cases per 100,000 population (n=68). The remaining IR by district included Southwest 6.6 per cases per 100,000 population (n=70), Southeast 4.2 cases per 100,000 population (n=20), and Northwest 2.9 cases per 100,000 population (n=46). Females accounted for 54.2% of the cases, 30.8% (n=95) of the cases were hospitalized and there were 3 deaths[¥] in 2012. The race specific IR was higher for whites with a 4.8 cases per 100,000 population (n=244).

Missouri also reported 18 cases of HUS for 2012 resulting in an IR of 0.3 cases per 100,000 population; this is an increase of 38.5% compared to the previous five-year median. The cases range in age from 1 to 73 years and a median age of 3 years. Sixty-seven percent of the HUS cases were reported among children 1-4 years of age. Females account for 72.2% of the cases, 88.9% (n=16) of the cases were hospitalized and there were 3 deaths[¥] in 2012. Of the 3 HUS deaths, 1 case was reported to have *E. coli* O157:H7 and the specific organism was not identified or reported for two cases.

Shiga-Toxin-producing *E. coli* (STEC))
Comparative Statistics by Socio-demographic Category, Missouri 2012[1]

		Case Count	Percent of Total	Rate per 100,000	5-Year Median	Percent Change from Median
Sex	Female	167	54.2%	5.4	80	108.8%
	Male	141	45.8%	4.8	76	85.5%
Race	Black	11	3.6%	1.5	6	83.3%
	Other	5	1.6%	3.1	2	150%
	Unknown	48	15.6%	N/A	N/A	N/A
	White	244	79.2%	4.8	115	112.2%
Age Group	00 to <01	11	3.6%	14.5	6	83.3%
	01 to 04	75	24.4%	24.3	42	78.6%
	05 to 14	49	15.9%	6.2	36	36.1%
	15 to 24	39	12.7%	4.7	26	50%
	25 to 39	48	15.6%	4.2	22	118.2%
	40 to 64	51	16.6%	2.5	23	121.7%
	65 and older	35	11.4%	4.1	13	169.2%
District	Central	68	22.1%	10.2	17	300%
	Eastern	104	33.8%	4.7	55	89.1%
	Northwest	46	14.9%	2.9	31	48.4%
	Southeast	20	6.5%	4.2	14	42.9%
	Southwest	70	22.7%	6.6	54	29.6%
	State of Missouri	308	100%	5.1	153	101.3%

[1]Socio-demographic Category Information is missing for some cases. N/A=No computation made.
Data Source: Missouri Health Information Surveillance System (WebSurv).

Hemolytic Uremic Syndrome
Comparative Statistics by Socio-demographic Category, Missouri 2012[1]

		Case Count	Percent of Total	Rate per 100,000	5-Year Median	Percent Change from Median
Sex	Female	13	72.2%	0.4	7	85.7%
	Male	5	27.8%	0.2	6	-16.7%
Race	Black	0	0%	0	1	-100%
	Other	1	5.6%	0.6	0	N/A
	Unknown	1	5.6%	N/A	N/A	N/A
	White	16	88.9%	0.3	12	33.3%
Age Group	00 to <01	0	0%	0	0	0%
	01 to 04	12	66.7%	3.9	6	100%
	05 to 14	3	16.7%	0.4	3	0%
	15 to 24	0	0%	0	0	0%
	25 to 39	0	0%	0	0	0%
	40 to 64	1	5.6%	0	1	0%
	65 and older	2	11.1%	0.2	1	100%
District	Central	7	38.9%	1	2	250%
	Eastern	2	11.1%	0.1	3	-33.3%
	Northwest	0	0%	0	2	-100%
	Southeast	2	11.1%	0.4	2	0%
	Southwest	7	38.9%	0.7	5	40%
	State of Missouri	18	100%	0.3	13	38.5%

[1]Socio-demographic Category Information is missing for some cases. N/A=No computation made.
Data Source: Missouri Health Information Surveillance System (WebSurv).

Clinical isolates of STEC identified by laboratories are required to be submitted to the Missouri State Public Health Laboratory (MSPHL) for confirmation, identification, and analysis by pulsed-field gel electrophoresis (PFGE). The MSPHL confirmed and serogrouped 265 (92.3%) of the 287 confirmed STEC cases. Of those 51.7% (n=137) were *E. coli* O157:H7, the rest were non-O157:H7 STEC strains. Fourteen additional Missouri cases were reported through 5 different state public health laboratories. The Missouri Department of Health and Senior Services (MDHSS) also utilizes PFGE to detect clusters and/or outbreaks, both in Missouri and nationwide.

Five STEC outbreaks were reported in Missouri in 2012, resulting in 58 cases collectively. In January 2012, a multistate outbreak of *E. coli* O26 included 3 cases from Missouri. The outbreak was associated with the consumption of raw clover sprouts. The source of the contamination was determined to have originated from the seeds used to produce the sprouts. In March 2012, an *E. coli* O157:H7 outbreak resulted in 19 cases from multiple jurisdictions in the Central region of Missouri.

Section A - Communicable Disease Surveillance

STEC and HUS-continued

The findings of the investigation strongly suggested products including unpasteurized dairy (consumed by 89% of cases) and ground beef (consumed by 32% of cases) were the likely sources of infection for each of the cases associated with this outbreak. An outbreak of untyped STEC in July 2012, consisted of 11 cases among members of a church group following a trip to Honduras. The potential source of infection for the outbreak could not be determined. In August 2012, an outbreak of *E. coli* O157:H7 resulted in 17 cases among residents of jurisdictions in the Eastern district of Missouri. The illnesses were reported following attendance at a church-sponsored meal provided to the community. The specific source of the illnesses was not identified. The final STEC outbreak of the year in Missouri occurred in September, 2012. A total of 8 cases of *E. coli* O157:H7 were identified from multiple jurisdictions located in the Southeast district of Missouri. The specific source of the infections could not be identified. Although outbreak associated cases (18.8% of cases) contributed, they do not fully account for the 101.3% increase in STEC cases reported from Missouri in 2012. The specific cause(s) of the observed increase in the other cases are not known.

Challenges: There are many possible sources and modes of transmission by which persons can become exposed to STEC including, but not limited to, consumption of contaminated food or water, contact with animals or their environment, and directly from one person to another. Examples of foods that have been associated with outbreaks include ground beef, raw leafy greens, and unpasteurized dairy or juice. Outbreaks of STEC have resulted from contact with animals or their environment at locations such as petting zoos, contaminated drinking water, and ingestion of contaminated recreational water. Person-to-person transmission often occurs among family members and can occur in settings such as daycares. Identifying a specific source(s) of STEC infections can be difficult due to the many possible sources and modes of transmission. In addition, obtaining a complete exposure history is difficult as persons may not be able to provide a complete exposure for the 10 days prior to onset of symptoms, which can be exacerbated by the inherit delays in reporting. Additional challenges presented by STEC include: identifying non-O157 STEC infections is more complex than identifying those from STEC O157; developing effective education methods and materials for food service workers and consumers, especially with regards to thoroughly cooking ground beef and meat that has been needle-tenderized to a temperature of at least 160°F (70˚C); also avoiding the consumption of raw milk, unpasteurized dairy products, and unpasteurized juices (like fresh apple cider).

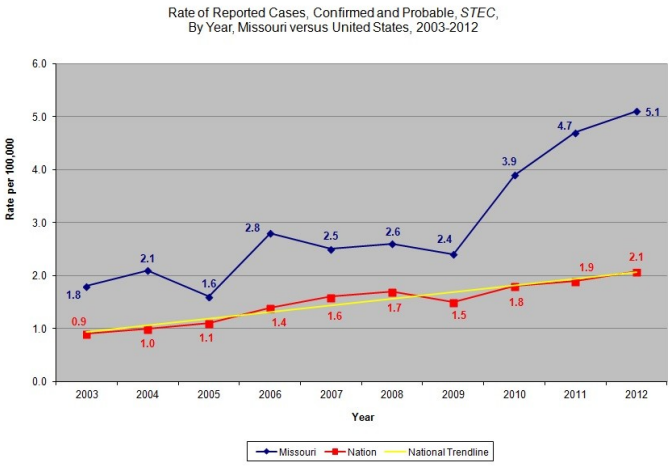
The Centers for Disease Control and Prevention reported other STEC outbreaks in the U.S. in 2012, of which Missouri did not have any associated cases. These outbreaks include: Multistate Outbreak of Shiga Toxin-producing *Escherichia coli* O157:H7 Infections Linked to Organic Spinach and Spring Mix Blend, and a Multistate Outbreak of Shiga Toxin-producing *Escherichia coli* O145 Infections—source not identified.

Comparison to National Data: In 2012, the statewide IR was 5.1 cases per 100,000 as compared to the national IR of 2.1 cases per 100,000 population. During the years 2003 to 2012, the rate of STEC cases in Missouri has consistently exceeded the corresponding rate nationally. However, the rates for both have been gradually trending upward despite a slight decrease observed in 2009. The national rate remained between 0.9 to 2.1 cases per 100,000 population during the years 2003 to 2012. In Missouri, the rate varied from 1.6 to 5.1 cases per 100,000 population during the same time period. Whether these trends represent an actual increase in the incidence of STEC cases or are a reflection of increased testing or changes in diagnostic strategies is unknown.

Section A - Communicable Disease Surveillance

STEC and HUS-continued

Illnesses caused by STEC are potentially severe and life-threatening and can result from exposures to many different possible sources. It is therefore critically important that cases continue to be promptly reported and potential sources investigated. Identifying the specific source of infection is often difficult, particularly in the absence of an outbreak. The collection of accurate exposure information from the ill persons or their surrogates remains an integral component of public health surveillance. With the increased risk of severe complications for children, it is critical for parents and guardians to implement preventive measures to reduce the risk of developing a STEC associated illness.



Prevention:

- Know your risk of food poisoning. People at higher risk for foodborne illness are pregnant women and newborns, children, older adults, and those with weak immune systems.
- Consult your healthcare provider if you think you might be ill with *E. coli* infection.
- Practice proper hygiene, especially good hand washing.
- Wash your hands thoroughly after using the bathroom, changing diapers, and before preparing or eating food.
- Wash your hands after contact with animals or their environments (at farms, petting zoos, fairs, even your own backyard).
- Always wash your hands before preparing and feeding bottles or foods to an infant, before touching an infant's mouth, and before touching pacifiers or other things that go into an infant's mouth.
- Keep all objects that enter infants' mouths (such as pacifiers and teethers) clean.
- If soap and water aren't available for washing hands, use an alcohol-based hand sanitizer. These alcohol -based products can quickly reduce the number of germs on hands in some situations, but they are not a substitute for washing with soap and running water.

Follow clean, separate, cook, chill guidelines, which can be found at FoodSafety.gov.

- Cook meats thoroughly. Ground beef and meat that has been needle-tenderized should be cooked to a temperature of at least 160°F (70˚C). Use a thermometer to verify the temperature, as color is not a very reliable indicator of how thoroughly meat has been cooked.
- Prevent cross-contamination in food preparation areas by thoroughly washing hands, counters, cutting boards, and utensils after they touch raw meat.
- Avoid consuming raw milk, unpasteurized dairy products, and unpasteurized juices (like fresh apple cider).
- Avoid swallowing water when swimming and when playing in lakes, ponds, streams, swimming pools, and backyard "kiddie" pools.

Please see the FoodSafety.gov page on E. coli to learn more information about *E. coli* and how to prevent infection.

Additional Website Resources:

CDC Health Topics

CDIRM

Section A - Communicable Disease Surveillance

Tuberculosis (TB) and Latent Tuberculosis Infection (LTBI)

Click to View

2012 TB Case Total	**89**	**2012 Incidence Rate**	**1.5 per 100,000**
2011 TB Case Total	**98**	**2011 Incidence Rate**	**1.6 per 100,000**
2012 LTBI Case Total	**2,601**	**2012 Incidence Rate**	**43.3 per 100,000**
2011 LTBI Case Total	**2,949**	**2011 Incidence Rate**	**49.2 per 100,000**

TB is a disease caused by the bacterium *Mycobacterium tuberculosis* (*M. tuberculosis*). *M. tuberculosis* can infect any part of the body, but it usually infects the lungs. *M. tuberculosis* is spread through the air from one person to another. The bacteria are expelled into the air when a person with TB disease of the lungs or throat coughs, sneezes, speaks or sings. The bacteria can stay in the air for several hours, depending on the environment. People who become infected with *M. tuberculosis* usually have had very close, day-to-day contact with someone who has TB disease (e.g. a family member, friend, or close co-worker). Persons are not likely to become infected from someone coughing in line at a supermarket or restaurant. In addition, items such as dishes, drinking glasses, sheets, or clothing do not spread TB.

Persons at greatest risk for exposure to TB include; close contacts of a person with known or suspected TB disease, foreign-born persons from areas where TB is common, resident or employee of high-risk congregate settings such as jails, prisons, homeless shelters and nursing homes, and health care workers. Persons at higher risk for developing disease once infected include HIV-positive persons, persons with other certain medical conditions, and the medically underserved.

Infection with *M. tuberculosis* causes two TB-related conditions called LTBI and TB disease. Most persons who become infected with *M. tuberculosis* develop an infection called LTBI. The body is able to fight the bacteria and prevent it from multiplying and spreading. Persons with LTBI are infected with *M. tuberculosis* though have no symptoms and do not feel sick. Persons with LTBI are not infectious and cannot spread *M. tuberculosis* to others. However, if *M. tuberculosis* becomes active and multiply, the person will go from having LTBI to being sick with TB disease and potentially be infectious to others.

Symptoms of TB disease will depend on where in the body the *M. tuberculosis* has infected and is multiplying. TB disease of the lungs may cause a bad cough that lasts longer than 3 weeks, pain in the chest, coughing up blood or sputum (phlegm from deep inside the lungs). Other symptoms of TB disease are weakness or fatigue, weight loss, no appetite, chills, fever, and sweating at night. For more information on LTBI or TB disease visit: http://health.mo.gov/living/healthcondiseases/communicable/tuberculosis/index.php or http://www.cdc.gov/tb/.

Missouri Incidence: Statewide in 2012, a total of 89 cases of TB disease were reported in Missouri. This represents a statewide incidence rate (IR) of 1.5 cases per 100,000 population. TB disease decreased by 16% when compared to the pervious five-year median data from 2007-2011.

Persons with TB disease ranged in age from 5 months to 97 years, with a median age of 50 years. The highest age specific IR of 3.3 cases per 100,000 population was observed in persons 65 and older; followed by children <1 year old with a IR of 2.6 cases per 100,000 population. Persons 40 years of age and older accounted for 68.6% of the TB disease cases in Missouri. The highest proportion of case (41.6%) occurred in the Eastern district, resulting in an IR of 1.7 cases per 100,000 population (n=37). However, the highest district IR of 2.7 cases per 100,000 population (n=13) was observed in Southeast district.

Section A - Communicable Disease Surveillance

TB and LTBI-continued

The remaining district specific IR are 1.5 cases per 100,000 population (n=24) in the Northwest, 0.9 cases per 100,000 population (n=6) in the Central, and 0.9 cases per 100,000 population (n=9) in the Southwest district. The IR of TB disease for some of the larger population areas of the state include: Joplin 8.1 cases per 100,000 population (n=4), Kansas City 3.3 cases per 100,000 population (n=15), St. Louis City 3.1 cases per 100,000 population (n=10), St. Louis County 2.1 cases per 100,000 population (n=21) and 0.4 cases per 100,000 population (n=1) in Springfield/Greene County.

Tuberculosis
Comparative Statistics by Socio-demographic Category, Missouri 2012[1]

		Case Count	Percent of Total	Rate per 100,000	5-Year Median	Percent Change from Median
Sex	Female	30	33.7%	1	46	-34.8%
	Male	59	66.3%	2	61	-3.3%
Race	Black	30	33.7%	4.1	36	-16.7%
	Other	21	23.6%	13.1	25	-16.0%
	White	38	42.7%	0.7	48	-20.8%
Age Group	00 to <01	2	2.2%	2.6	1	100%
	01 to 04	1	1.1%	0.3	3	-66.7%
	05 to 14	1	1.1%	0.1	1	0%
	15 to 24	7	7.9%	0.8	14	-50%
	25 to 39	17	19.1%	1.5	24	-29.2%
	40 to 64	33	37.1%	1.6	35	-5.7%
	65 and older	28	31.5%	3.3	21	33.3%
District	Central	6	6.7%	0.9	6	0%
	Eastern	37	41.6%	1.7	48	-22.9%
	Northwest	24	27.0%	1.5	23	4.3%
	Southeast	13	14.6%	2.7	10	30%
	Southwest	9	10.1%	0.9	10	-10%
	State of Missouri	89	100%	1.5	106	-16%

[1]Socio-demographic Category Information is missing for some cases. N/A=No computation made.
Data Source: Missouri Health Information Surveillance System (WebSurv).

In 2012, males accounted for 66.3% of the TB disease cases, 52.8% (n=47) of the cases were hospitalized and there were 14 deaths[¥]. Twelve of the fatal cases of TB disease died during treatment and two were diagnosed at death. The age range for those persons who died with TB disease in Missouri was 44 to 97 years, with a median age of 70 years.

Forty-five percent (n=40) of TB disease cases in Missouri during 2012 were born outside of the U.S., but were diagnosed with TB disease while residing in Missouri. This represents a 6% increases in the foreign-born TB disease cases compared to 2011. Foreign-born TB disease cases continue to comprise a significant portion of TB disease in Missouri.

Seventeen percent of the TB disease cases in Missouri were considered preventable in 2012, as compared to 2005, when 57% of the cases in Missouri were considered preventable. The decrease in preventable cases is due to improved case management, contact investigations, and documentation. These improvements are the result of a number of factors such as improved program management and training, implementation of the cohort review process, quality assurance goals, and to other factors.

Clinical isolates of *M. tuberculosis* identified by laboratories are required to be submitted to the Missouri State Public Health Laboratory (MSPHL) for confirmation and epidemiological analysis. The MSPHL tested 100% (n=76) of the confirmed TB disease cases (13 cases were either clinical cases, physician diagnosed, or died at diagnosis and cultures were not available). Of the 76 culture confirmed TB cases in Missouri, 64% (n=49) were pulmonary TB, 36% (n=27) were extra-pulmonary and 6 cases had both pulmonary and extra pulmonary TB disease. Of the 49 cases with pulmonary TB 41% (n=20) were identified at the MSPHL using Gen-Probe MTD NAA testing from diagnostic clinical specimens.

No TB disease outbreaks were reported in Missouri during 2012, however one TB disease case (a 94 year old resident of a long-term care facility in southeast Missouri) required an extended TB contact investigation. There were 106 contacts evaluated, with 13 of these contacts diagnosed with LTBI. No additional TB disease was identified as a result of this contact investigation.

The Columbia Regional Care Center (CRCC) in Columbia, South Carolina serves as the state TB referral hospital. In 2012, CRCC treated 2 TB disease patients from Missouri in their unit.

Section A - Communicable Disease Surveillance

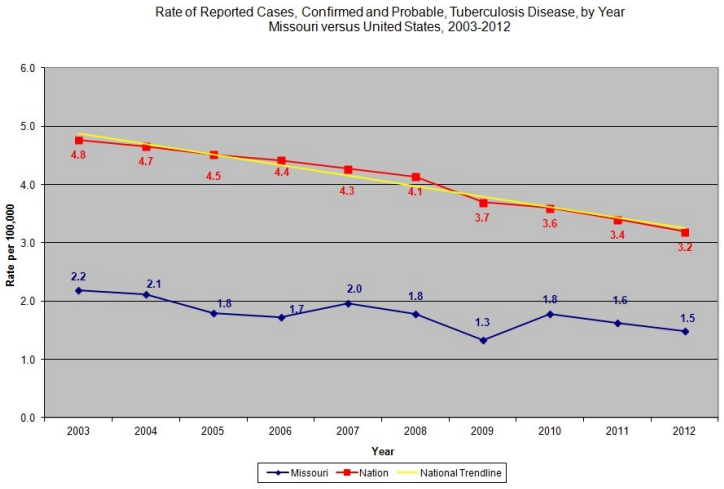
TB and LTBI - continued

Latent Tuberculosis Infection Comparative Statistics by Health Regions, Missouri 2012[1]					
	Case Count	Percent of Total	Rate per 100,000	5-Year Median	Percent Change from Median
Central	251	9.7%	37.5	387	-35.1%
Eastern	1,156	44.4%	51.7	1,209	-4.4%
Institutionalized	163	6.3%	525.5	136	19.9%
Northwest	544	20.9%	34.6	672	-19%
Southeast	152	5.8%	32	126	20.6%
Southwest	335	12.9%	31.7	718	-53.3%
State of Missouri	2,601	100%	43.3	3,393	-23.3%

[1]Socio-demographic Category Information is missing for most Tuberculosis Infection Data. N/A=No computation made.
Data Source: Missouri Health Information Surveillance System (WebSurv).

A total of 2,601 cases of LTBI were reported from Missouri in 2012. Missouri is one of only a few states that requires the reporting of persons with LTBI. The reason for this is approximately 10% of persons with LTBI will develop TB disease in their lifetime if not treated. The treatment of LTBI substantially reduces the risk that persons infected with *M. tuberculosis* will progress to TB disease. Usually a person with LTBI has a normal chest x-ray and a negative sputum smear with a positive TST (tuberculin skin test) or blood test result indicating TB infection. For more information on LTBI treatment visit: http://www.cdc.gov/tb/publications/faqs/qa_latenttbinf.htm#Latent5.

Comparison to National Data: In 2012, the statewide IR of TB disease was 1.5 cases per 100,000, as compared to the national IR of 3.2 cases per 100,000 population. The TB disease IR per 100,000 population for Missouri ranged from 1.3 to 2.2 cases during the years 2003 to 2012, as compared to 3.2 to 4.8 cases per 100,000 population nationally for the same period. For this period the IR of TB disease in Missouri has declined and consistently has been below the corresponding rate nationally. Over the past 17 years, Missouri also observed a steady decline in the number of TB disease cases from 224 cases in 1996 to 89 cases in 2012. Nationally in 2012, 63% of all TB disease cases were in individuals who were born outside of the U.S., as compared to 45% in Missouri.



Challenges: Even though the number of reported TB disease cases continues to decline, both in Missouri and nationally, many TB related challenges exist including:

- Assuring all TB disease patients complete their treatment regimen. Treating a patient with TB disease requires at least six months of a multiple-drug regimen. Treating individuals with drug-resistant TB requires costly medications that may be used for an extended period of time. The all drug therapy (ADT), percentage for completion of therapy (COT) was 96% for cases in Missouri as compared to the national ADT/COT of 93% (2 cases in Missouri moved out of the country and 1 case refused treatment).
- Improve delays in detecting, reporting and treating cases of pulmonary TB disease (e.g. people are being diagnosed in the hospital or at death with TB disease).
- Locating, testing and treating all contacts to infectious TB disease cases. (Younger TB disease patients tend to have a greater number of contacts that must be found for testing and treatment.)
- The prevalence of TB disease among foreign-born person residing in Missouri.

Section A - Communicable Disease Surveillance

TB and LTBI - continued

- The presence of a substantial population of persons living with LTBI who are at risk for progression to TB disease, who opt not to take LTBI treatment. LTBI is generally treated with one medication for 9 to 12 months.
- Maintaining clinical and public health expertise in an era of declining TB disease incidence.

Persons with pulmonary TB disease can be infectious, therefore prompt treatment of all TB disease is essential to end symptoms, prevent disability or death, and prevent transmission of TB disease to others. It is critically important that TB disease cases be detected early and promptly reported to public health for case management (to ensure COT) and investigation, so contacts can be identified, tested and treated as appropriate. The collection of accurate exposure information from TB disease cases or their surrogates continues to be an integral component of public health surveillance.

Prevention: There are certain things persons with TB disease who are infectious can do to protect themselves and others. The most important is to take the medications as prescribed. Persons with pulmonary TB disease should always cover their mouth with a tissue when coughing, sneezing, or laughing and then place the tissue in a closed bag and throw it away. Persons infectious with TB disease should also separate themselves from others and avoid close contact with anyone (e.g. do not go to work, school, or be around other people until approved to do so by public health officials). In addition they should sleep in a bedroom away from other family members. Air out their room as often as possible to the outside of the building (weather permitting). TB spreads in small, closed spaces where air does not move. Put a fan in the window to blow out (exhaust) air that may be filled with *M. tuberculosis* . If other windows in the room are opened, the fan also will pull in fresh air. This will reduce the chances that *M. tuberculosis* will stay in the room and infect someone who breathes the air.

Remember, TB is spread through the air. People cannot get infected with *M. tuberculosis* through handshakes, sitting on toilet seats, or sharing dishes and utensils with someone who has TB disease. After taking medication, as directed, for two to three weeks, you may no longer be able to spread TB to others. Persons with TB disease will be able to go back to their daily routine once the medical providers and public health officials agrees they are not longer infectious to others. Remember, persons with TB disease will get well only by taking their medicine exactly as directed. Please refer to http://www.cdc.gov/tb/publications/factseries/prevention_eng.htm for additional prevention information.

Additional Website Resources:

CDC Health Topics

TB Case Management Manual

Section A - Communicable Disease Surveillance

Tularemia

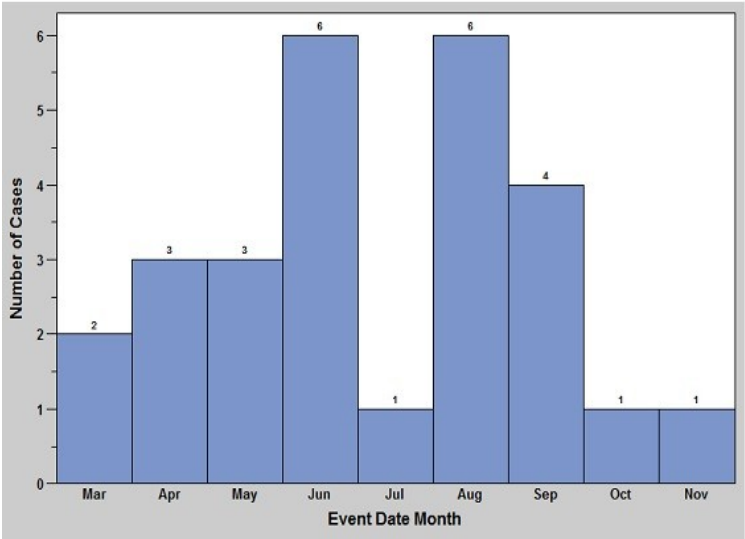
2012 Case Total 27 **2012 Incidence Rate 0.4 per 100,000**
2011 Case Total 21 **2011 Incidence Rate 0.4 per 100,000**

Click to View

Tularemia is a disease of animals and humans caused by the bacterium *Francisella tularensis* (*F. tularensis*). Rabbits, hares, and rodents are especially susceptible and often die in large numbers during outbreaks. *F. tularensis* is one of the most infectious bacterial species known (10-50 or so organisms) can cause disease. Humans may be infected by several different routes including tick and deer fly bites, skin contact with infected animals, ingestion of contaminated water, laboratory exposure, inhalation of contaminated dusts or aerosols. In addition, humans could be exposed as a result of bioterrorism. Symptoms vary depending upon the route of infection. Symptoms usually appear 3 to 5 days after exposure to the bacteria, but can take as long as 21 days. Common symptoms are abrupt onset of fever and chills. These symptoms typically last for several days, then remit for a brief interval, and then recur. Additional symptoms can include pulse-temperature dissociation, headache, anorexia, malaise and fatigue or prostration, myalgia, cough, vomiting, pharyngitis, and abdominal pain. There are several different clinical presentations of tularemia related to the route of exposure. Of the 27 reported cases in 2012, 63% (n=17) were classified as ulceroglandular, 29.6% (n=8) were glandular and 7.4% (n=2) were typhoidal. Secondary pneumonitis may occur in 45-83% of patients with the typhoidal form of tularemia. Up to 20% of patients may have a rash.

F. tularensis is very infectious; however the bacteria are not spread from person-to-person. Untreated tularemia has a mortality rate of 5-15%; if treated the disease carries a mortality rate of 1-3%. The mortality rate is 2-3 times higher in patients with typhoidal tularemia than in those with other forms. Tularemia may lead to months of debility in some people, usually associated with late lymph node suppuration or persistent fatigue. Patients with severe disease may manifest disseminated intravascular coagulation, renal failure, rhabdomyolysis, jaundice, and hepatitis. Features associated with a worse prognosis include increased age, serious coexisting medical conditions, symptoms lasting 1 month or longer before treatment, significant pleuropulmonary disease, typhoidal illness, renal failure, a delay in the diagnosis and inappropriate antibiotic therapy. For more information visit: http://www.cdc.gov/tularemia/index.html.

Reported Number of Tularemia Cases, Confirmed and Probable
By Event Date Month, Missouri, 2012



Missouri Incidence: Missouri typically leads the nation in the number of tularemia cases reported each year. In 2012, tularemia increased by 28.6% when compared to the five-year median data from 2007-2011. A seasonal trend for tularemia was noted in Missouri with 62.9% (n=17) of the cases, occurring in the months of June through September.

Persons with tularemia ranged in age from 2 to 85 years, with a median age of 45 years.

Section A - Communicable Disease Surveillance

Tularemia-continued

The highest age specific incidence rates (IR) per 100,000 population occurred among adults older than 65 years which was 0.8 cases per 100,000 population followed by children 5-14 years of age; which was 0.5 per 100,000 population.

The highest proportion of cases, 22.2% (n=6) was shared by three districts; Central, Southwest and Northwest. However, the highest district IR occurred in Southeast which was 1.1 per 100,000 population (n=5). Central was 0.9 per 100,000 population, Southwest was 0.6 per 100,000 population, Northwest was 0.4 per 100,000 population and Eastern was 0.2 per 100,000 population (n=4).

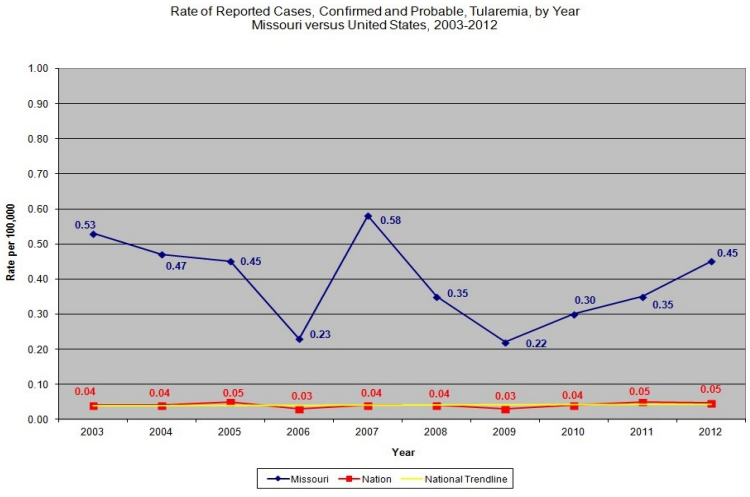
Tularemia
Comparative Statistics by Socio-demographic Category, Missouri 2012[1]

		Case Count	Percent of Total	Rate per 100,000	5-Year Median	Percent Change from Median
Sex	Female	14	51.9%	0.5	7	100%
	Male	13	48.1%	0.4	11	18.2%
Race	Black	1	3.7%	0.1	0	N/A
	Unknown	2	7.4%	N/A	N/A	N/A
	White	24	88.9%	0.5	19	26.3%
Age Group	00 to <01	0	0%	0	0	0%
	01 to 04	3	11.1%	1	2	50%
	05 to 14	4	14.8%	0.5	3	33.3%
	15 to 24	2	7.4%	0.2	1	100%
	25 to 39	2	7.4%	0.2	3	-33.3%
	40 to 64	9	33.3%	0.4	6	50%
	65 and older	7	25.9%	0.8	6	16.7%
District	Central	6	22.2%	0.9	3	100%
	Eastern	4	14.8%	0.2	2	100%
	Northwest	6	22.2%	0.4	3	100%
	Southeast	5	18.5%	1.1	3	66.7%
	Southwest	6	22.2%	0.6	9	-33.3%
	State of Missouri	27	100%	0.4	21	28.6%

[1]Socio-demographic Category Information is missing for some cases. N/A=No computation made.
Data Source: Missouri Health Information Surveillance System (WebSurv).

Females account for 51.9% of the cases; 44.4% (n=12) of the cases were hospitalized and there were no deaths[¥]. Only clinical isolates of pneumonic tularemia identified by laboratories are required to be submitted to the Missouri State Public Health Laboratory (MSPHL) for confirmation and identification. There were no pneumonic tularemia cases or tularemia outbreaks reported in 2012. The 28.6% increase over the five-year median may be due to local variability in the tick population, to the level of disease in rabbits and other primary hosts, or to other unknown factors.

Challenges: tularemia is a potentially deadly disease that can be difficult to diagnose as the symptoms can be mistaken for other more common illnesses. For this reason, it is important for persons with symptoms of tularemia to seek medical care and inform their health care provider of any likely exposures, such as tick and deer fly bites, or contact with sick or dead animals. In addition, until recently, a vaccine was available to protect laboratory employees routinely working with *F. tularensis*. This vaccine is currently under review by the U.S. Food and Drug Administration (FDA) and is not generally available in the U.S. Developing effective education methods and materials to prevent tularemia is an ongoing public health challenge.



Comparison to National Data: In 2012, the statewide IR was 0.45 cases per 100,000 as compared to the national IR of 0.05 cases per 100,000 population. The tularemia IR per 100,000 population for Missouri ranged from 0.22 to 0.58 cases during the years 2003 to 2012, as compared to 0.03 to 0.05 cases per 100,000 population nationally for the same period.

Tularemia is a relatively rare condition in the U.S. with 95-166 cases reported nationally during the period 2004-2012 (median=134 cases).

Section A - Communicable Disease Surveillance

Tularemia-continued

Missouri has been above the national IR for the last ten years. An steady increase in the annual IR of reported tularemia cases in Missouri has been observed the past three years beginning in 2010. Missouri reported 236 cases of tularemia (the highest number of cases in the nation) for the ten year period (2003 to 2012). This represents 18% of all the tularemia cases that were reported nationally. However, the highest state IR for 2012 occurred in Kansas which was 0.76 per 100,000 population (n=22), followed by Arkansas 0.75 per 100,000 population (n=22), South Dakota 0.60 per 100,000 population (n=5), Missouri 0.45 per 100,000 population (n=27) and Oklahoma 0.45 per 100,000 population (n=17).

Nationally, tularemia is more common in the months of May through September resulting from the bites of infected ticks or deer flies, but illness due to animal handling and hunting can occur at any time of the year. Nationally tularemia occurs in persons of all ages, but is most common in children and tularemia is generally more common in males, possibly because of a greater likelihood of exposure through hunting and landscaping.

If *F. tularensis* were used as a weapon (bioterrorism), the bacteria would likely be made airborne for exposure by inhalation. People who inhale an infectious aerosol would generally experience severe respiratory illness, including life-threatening pneumonia and systemic infection, if they are not treated. The bacteria that cause tularemia occur widely in nature and could be isolated and grown in quantity in a laboratory, although manufacturing an effective aerosol weapon would require considerable sophistication. Therefore, it is important that tularemia continue to be promptly reported and investigated. The collection of accurate exposure information from ill persons or their surrogates remains an integral component of public health surveillance.

Given the historic and continued high incidence of tularemia in Missouri, it is important for Missourians to protect themselves from exposure to this potentially deadly disease. There is no reason to stop enjoying the great outdoors. By following a few simple precautions, people can continue to interact with nature and reduce the risk of developing illnesses including tularemia.

Prevention:

- When hiking, camping or working outdoors:
  1. Use insect repellants containing 20% to 30% DEET, picaridin or IR3535.
  2. Wear long pants, long sleeves, and long socks to keep ticks off your skin.
  3. Remove attached ticks promptly with fine-tipped tweezers.
- Don't drink untreated surface water.
- When mowing or landscaping:
  1. Don't mow over sick or dead animals.
  2. Consider using dust masks to reduce your risk of inhaling the bacteria.
- If you hunt, trap or skin animals:
  1. Use gloves when handling animals, especially rabbits, muskrats, prairie dogs, and other rodents.
  2. Cook game meat thoroughly before eating.

Additional Website Resources:

CDC Health Topics

CDIRM

Section A - Communicable Disease Surveillance

Vibriosis

2012 Case Total 8 **2012 Incidence Rate 0.1 per 100,000**
2011 Case Total 3 **2011 Incidence Rate 0.1 per 100,000**

Click to View

Vibrio are gram-negative, rod-shaped bacterium that occur naturally in estuarine or marine environments. Roughly a dozen species are known to cause disease in humans, and infection is usually from exposure to seawater or consumption of raw or undercooked seafood (especially oysters, crabs, and shrimp). Vibriosis affects all age groups causing a variety of clinical syndromes, including gastroenteritis, wound infection, and bacteremia. Gastroenteritis is the most common syndrome, and is characterized by acute onset of watery stools and crampy abdominal pain 5 to 93 hours after infection. Approximately 50% of persons with vibriosis will have a low-grade fever, headache, and chills; approximately 30% will have vomiting, and spontaneous recovery follows in 2 to 5 days. Wound infections can result from exposure of a preexisting wound to contaminated sea water or from punctures resulting from handling contaminated shellfish. Wound infections can be severe in people with liver disease or who are immunocompromised. Infections caused by *Vibrio vulnificus* have been associated with high morbidity and mortality rates. All persons are at risk. Persons with underlying medical conditions, especially liver disease, may be at increased risk of infection and serious complications. For more information on vibriosis visit http://www.cdc.gov/vibrio/.

Missouri Incidence: In 2012, vibriosis increased by 600% (n=8) when compared to the five-year median data from 2007-2011. In Missouri, the 8 cases were seen in the months of May (n=1), June (n=3), July (n=2), September (n=1) and November (n=1). Infections are seasonal; nationally over 70% of the cases occur between May and October. Environmental factors, such as warm water and moderate salinity, can increase the number of *Vibrio* organisms in shellfish. Persons with vibriosis ranged in age from 6 to 95 years, with a median age of 45 years. The highest age specific incidence rates (IR) per 100,000 population occurred among children 5 to 14 years which was 0.3 cases per 100,000; followed by adults 40-64 years of age which was 0.2 cases per 100,000 population. In 2012, 100% of all reported vibriosis cases in Missouri occurred in the Eastern district (n=8). Eastern district has an IR of 0.4 cases per 100,000 population. Males accounted for 62.5% of the cases, 12.5% (n=1) of the cases were hospitalized and there were 0 deaths[¥] in 2012. The race specific IR was higher for whites with a 0.1 cases per 100,000 population (n=7).

Vibriosis*
Comparative Statistics by Socio-demographic Category, Missouri 2012[1]

		Case Count	Percent of Total	Rate per 100,000	4-Year Median	Percent Change from Median
Sex	Female	3	37.5%	0.1	N/A	N/A
	Male	5	62.5%	0.2	N/A	N/A
Race	Black	0	0%	0	0	0%
	Unknown	1	12.5%	N/A	N/A	N/A
	White	7	87.5%	0.1	N/A	N/A
Age Group	00 to <01	0	0%	0	0	0%
	01 to 04	0	0%	0	0	0%
	05 to 14	2	25%	0.3	N/A	N/A
	15 to 24	0	0%	0	0	0%
	25 to 39	1	12.5%	0.1	N/A	N/A
	40 to 64	4	50%	0.2	N/A	N/A
	65 and older	1	12.5%	0.1	N/A	N/A
District	Central	0	0%	0	0	0%
	Eastern	8	100%	0.4	N/A	N/A
	Northwest	0	0%	0	0	0%
	Southeast	0	0%	0	0	0%
	Southwest	0	0%	0	0	0%
	State of Missouri	8	100%	0.1	2	600%

[1]Socio-demographic Category Information is missing for some cases. N/A=No computation made. Vibriosis refers to any species of the family Vibrionaceae, other than toxigenic Vibrio cholerae O1 or O139. *In Missouri, vibriosis became reportable in 2008 providing only 4 years of data.
Data Source: Missouri Health Information Surveillance System (WebSurv).

Only clinical isolates of *Vibrio cholera (V. cholera)* identified by laboratories are required to be submitted to the Missouri State Public Health Laboratory (MSPHL) for confirmation. Only one *V. cholera* case was reported and that isolate was submitted to the MSPHL and subsequently sent to the Centers for Disease Control and Prevention (CDC) for additional testing. All eight of Missouri's vibriosis cases were serogrouped. Five different species were identified: *V. parahaemolyticus* (n=3); *V. mimicus* (n=2);

Section A - Communicable Disease Surveillance

Vibriosis-continued

V. alginolyticus (n=1); *V. fluvialis* (n=1); and *V. cholerae* O141 (n=1). *V. cholerae* has many different types or serogroups, only two of which can cause epidemic cholera. Cholera disease is caused by toxigenic *V. cholerae* O-group 1 or O-group 139 (O139 is found only in Asia).

The other *V. cholerae* serogroups are known collectively as non-O1 and non-O139 *Vibrio cholerae*. These serogroups can cause a diarrheal disease which is less severe than cholera and does not have epidemic potential. All of the cases reported in Missouri and discussed in this report are considered vibriosis.

One *vibriosis* outbreak was reported in 2012 (*V. parahaemolyticus)*; with three associated cases in Missouri. Investigators were able to trace the source of the cases to oysters harvested from a bay where water temperatures had been unseasonably warm during harvesting time. The warmer water temperatures allowed the bacteria to grow. Before 2012, *V. parahaemolyticus* infections of this strain were rarely associated with shellfish from the Atlantic coast. Identification of the cluster by Missouri investigators subsequently led to the discovery of a nationwide outbreak linked to oysters harvested from an Atlantic Bay and the temporary closure of the bay.

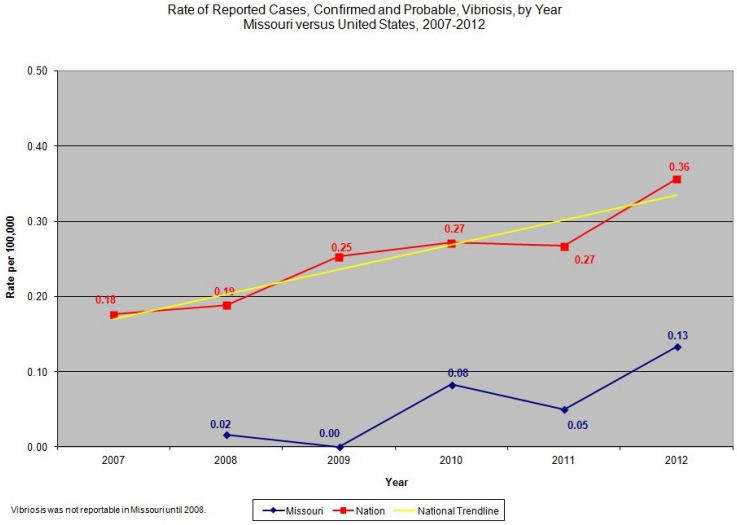
The afore mentioned outbreak was responsible for 37.5% (n=3) of the cases, but not the entire 700% increase above the five-year median that was observed. The reason for the increase in Missouri is unknown; however vibriosis exposure may be becoming more common for Missouri residents especially since modern shipping techniques have made it more common for fresh shellfish to be transported to the Midwest for consumption.

Challenges: Determining the source of non-outbreak related vibriosis infections can be difficult because *Vibrio* occurs naturally in warm coastal areas. *Vibrio* are not a result of pollution, so although oysters should always be obtained from reputable sources, eating oysters from "clean" waters or in reputable restaurants with high turnover does not provide protection. Challenges that have been acknowledged nationally include: many persons prefer to consume oysters and other shellfish raw. Many persons with liver disease are unaware of the hazards of raw oyster consumption and exposure to warm seawater. Not all strains of *Vibrio* cause illness. Large outbreaks have occurred when counts of *V. parahaemolyticus* in oysters from implicated sites were very low. Therefore, monitoring and responding to elevated counts of *V. parahaemolyticus* in the harvesting waters and in shellfish does not adequately protect the public health. Developing effective education methods and materials focusing on the risks associated with consumption of raw and undercooked shellfish, especially in warm months, and the timely reporting of *Vibrio* infections is important in preventing the disease.

Section A - Communicable Disease Surveillance

Vibriosis-continued

Comparison to National Data: In 2012, the statewide vibriosis IR was 0.13 cases per 100,000, as compared to the national IR of 0.36 cases per 100,000 population. The annual IR of vibriosis in Missouri remained relatively constant from 2008 to 2011. For these years, Missouri remained below the national IR of 0.18 - 0.36 cases per 100,000 population. (Vibriosis did not become nationally notifiable until 2007 and Missouri made the condition reportable in 2008.) According to CDC, approximately 80,000 illnesses, 500 hospitalizations, and 100 deaths are attributed to vibriosis each year in the US.



Most cases of *V. parahaemolyticus* infection are self-limited and do not require medical treatment, therefore cases may not be diagnosed or reported, and the actual number of *V. parahaemolyticus* infections may be greater. In contrast, if *V. vulnificus* is suspected, treatment should be initiated immediately because antibiotics improve survival. Aggressive attention should be given to the wound site; amputation of the infected limb is sometimes necessary. It is important that all cases of *Vibrio* infection to be promptly reported so potential sources can be investigated. The collection of accurate exposure information from the ill persons or their surrogates remains an integral component of public health surveillance.

Persons with underlying medical conditions, such as alcoholism and liver disease may be at increased risk of infection and serious complications. There is no vaccine to prevent vibriosis.

Prevention:

- Seafood should be appropriately handled and thoroughly cooked, especially oysters. For more on how to handle seafood safely visit: http://www.foodsafety.gov/keep/types/seafood/index.html.
- Abrasions suffered by ocean bathers should be rinsed with clean fresh water.
- All children, immunocompromised people, and people with chronic liver disease should avoid eating raw oysters or claims and should be advised of risks associated with seawater exposure if a wound is present or likely to occur.

For additional advice to consumers visit: http://www.cdc.gov/vibrio/investigations/vibriop-09-13/advice-consumers.html.

Additional Website Resources:

CDC Health Topics

CDIRM

Section A - Communicable Disease Surveillance

West Nile Virus Neuroinvasive Disease

Click to View

2012 Case Total	**18**	**2012 Incidence Rate**	**0.3 per 100,000**
2011 Case Total	**10**	**2011 Incidence Rate**	**0.2 per 100,000**

West Nile virus (WNV) is an arthropod-borne *flavivirus* most commonly spread by infected mosquitoes. The virus is transmitted to humans predominantly by mosquitoes of the *Culex* species, including the northern and southern house mosquito and the western encephalitis mosquito. The virus is maintained in nature in a bird-to-mosquito-to-bird transmission cycle, but human infections in North America occur primarily in the late summer and early fall when *Culex* species mosquitoes are at the peak of their annual reproductive cycle. The illness caused by the virus was first described in Africa in 1937, with outbreaks occurring later in Asia, Europe, and the Middle East.

Since the discovery of its North American introduction in 1999, WNV has expanded to the 48 contiguous states (not including Hawaii or Alaska). According to the Centers for Disease Control and Prevention (CDC), evidence of transmission in the form of infected humans, mosquitoes, birds, horses, or other mammals has been reported from 96% of the counties in the U.S. Anyone living in an area where WNV is present in mosquitoes can become infected. The risk of infection is highest for people who work outside or participate in outdoor activities because of greater exposure to mosquitoes. People with certain medical conditions, such as cancer, diabetes, hypertension and kidney disease are at greater risk for serious illness. The incubation period for WNV disease is usually 2 to 6 days but ranges 2 to 14 days and can be 21 days in immunocompromised people.

An estimated 70-80% of human WNV infections are subclinical or asymptomatic. Most symptomatic people experience an acute flu-like illness that can include a fever, headache, and muscle aches. Gastrointestinal complaints and a temporary spotted rash are also commonly reported. Less than 1% of infected persons develop a serious neurologic infection called West Nile virus neuroinvasive disease (WNND), which typically manifests as meningitis, encephalitis, or acute flaccid paralysis. WNV meningitis is clinically indistinguishable from aseptic meningitis caused by other viruses. Patients with WNV encephalitis usually present with seizures, mental status changes, focal neurologic deficits, or movement disorders. Most patients with non-neuroinvasive WNV disease or WNV meningitis recover completely, but fatigue, malaise, and weakness can linger for weeks or months after the initial infection. About 10 % of people who develop WNND will die.

No vaccine or specific antiviral treatments for WNV infection are available. Over-the-counter pain relievers can be used to reduce fever and relieve some symptoms. In severe cases, patients often need to be hospitalized to receive supportive treatment, such as intravenous fluids, pain medication, and nursing care. For more information on WNND visit: http://www.cdc.gov/westnile/index.html.

Missouri Incidence: In 2012, WNND increased by 200% (n=18) when compared to the five-year median data from 2007-2011. Cases were reported from ten city/county public health jurisdictions, including Kansas City and St. Louis City. In Missouri, the 18 cases were seen in the months of June (n=1), July (n=4), August (n=8) and September (n=5). Infections are generally seasonal. Persons with WNND ranged in age from 34 to 90 years, with a median age of 63 years. The highest age specific incidence rates (IR) per 100,000 population occurred among adults 65 years of age and older, which was 0.9 cases per 100,000 population; followed by 0.4 cases per 100,000 population among adults 40-64 years of age. Over 88% of the reported illnesses were in person 40 years of age and older. This reported disease burden is

Section A - Communicable Disease Surveillance

West Nile Virus Neuroinvasive Disease-continued

characteristic of WNV infection; to produce more severe illness in older people. The highest proportion of cases occurred in the Eastern district, which accounted for 44.4% (n=8) of the cases. The highest district specific IR of 0.4 cases per 100,000 population was observed in both Eastern (n=8) and Southeast (n=2) districts. The IR for the remaining districts included 0.3 cases per 100,000 population for both Central (n=2) and Northwest (n=5) and 0.1 cases per 100,000 population was observed in the Southwest (n=1). A 400% (n=5) increase in reported cases compared to the previous five-year median was observed in the Northwest district. The reason for this increase is unknown. The overall statewide IR of WNND cases in Missouri during the year 2012, was 0.3 cases per 100,000 population.

West Nile Virus Neuroinvasive Disease
Comparative Statistics by Socio-demographic Category, Missouri 2012[1]

		Case Count	Percent of Total	Rate per 100,000	5-Year Median	Percent Change from Median
Sex	Female	4	22.2%	0.1	2	100%
	Male	14	77.8%	0.5	4	250%
Race	Black	0	0%	0	2	-100%
	Other	1	5.6%	0.6	0	N/A
	Unknown	5	27.8%	N/A	N/A	N/A
	White	12	66.7%	0.2	4	200%
Age Group	00 to <01	0	0%	0	0	0%
	01 to 04	0	0%	0	0	0%
	05 to 14	0	0%	0	0	0%
	15 to 24	0	0%	0	0	0%
	25 to 39	2	11.1%	0.2	1	100%
	40 to 64	8	44.4%	0.4	4	100%
	65 and older	8	44.4%	0.9	2	300%
District	Central	2	11.1%	0.3	0	N/A
	Eastern	8	44.4%	0.4	4	100%
	Northwest	5	27.8%	0.3	1	400%
	Southeast	2	11.1%	0.4	0	N/A
	Southwest	1	5.6%	0.1	1	0%
	State of Missouri	18	100%	0.3	6	200%

[1]Socio-demographic Category Information is missing for some cases. N/A=No computation made.
Data Source: Missouri Health Information Surveillance System (WebSurv).

Males accounted for 77.8% of reported WNND cases in Missouri. This finding is consistent with blood bank studies indicating that while men and women generally have similar WNV infection rates, men tend to have a slightly higher incidence of neuroinvasive disease. Seventy-eight percent (n=14) of the cases were hospitalized and there were 3 deaths[¥] reported in 2012. Two thirds of the WNND cases in Missouri were reported as being white; however, racial identity was missing for 28% of the cases.

Clinical isolates of WNND identified by laboratories are not required to be submitted to the Missouri State Public Health Laboratory for confirmation or identification and there was no outbreaks of WNND reported in Missouri for 2012. The reason for the increase of WNND in Missouri could be the result of greater circulation of the *flavivirus* in nature, increased awareness, greater access to diagnostic tests, better reporting, or to other unknown factors.

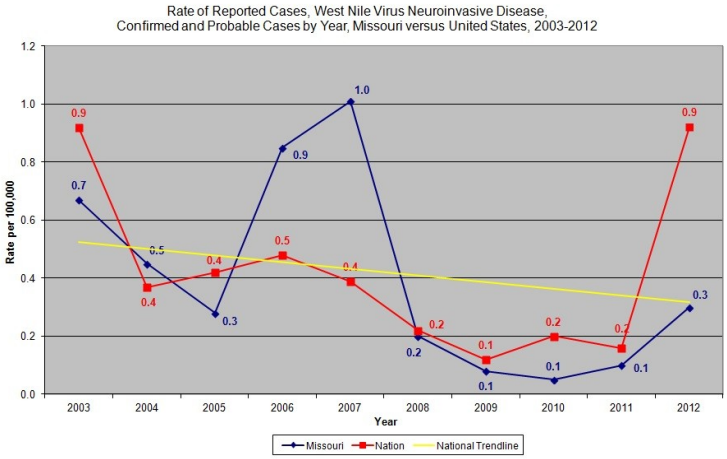
Challenges: Public health challenges associated with WNV include the lack of a licensed vaccine in humans to prevent infections and specific antiviral treatment for persons with WNV disease. The development of effective education methods and materials pertaining to personal protective measures to prevent WNV infection is an ongoing public health challenge.

In addition, the ecology of WNV in the U.S. is complex and varies considerably with geography. Outbreaks have been associated with a variety of biotic and abiotic factors, including urban habitats in northeastern states, agricultural habitats in western states, rural irrigated landscapes, increased temperature, specific precipitation patterns, socioeconomic factors, and neglected swimming pool density. No models have been developed to provide long-term predictions of how and where weather and environmental factors will combine to produce outbreaks of WNV. A continuing threat to Missourians for WNV resurgence is expected due to the summer weather patterns that can create conditions favorable to WNV activity.

Section A - Communicable Disease Surveillance

West Nile Virus Neuroinvasive Disease-continued

Comparison to National Data: In 2012, the statewide IR was 0.3 cases per 100,000 (n=18) as compared to the national IR of 0.9 cases per 100,000 population (n=2,873). The WNND IR per 100,000 population for Missouri ranged from 0.1 to 1.0 cases during the years 2003 to 2012, as compared to 0.1 to 0.9 cases per 100,000 population nationally for the same period. Nationally, WNND cases are up; 486 cases were reported in 2011 as compared to the 2,873 cases reported in 2012. A large multistate outbreak of WNV illnesses occurred in the U.S. in 2012, with a focal area of virus activity in Texas and adjacent states, Arizona, Nebraska, and the Dakotas. Missouri experienced a similar increase in reported cases in 2012. The annual IR of WNND in Missouri has remained relatively constant from 2008 to 2011. For those years and 2012, Missouri was at or below the national IR. (See the map for the Average Annual IR of WNND by state, 1999-2012.)



The collection of accurate exposure information from the ill persons or their surrogates remains an integral component of public health surveillance. Public health surveillance for human WNV infections is important for monitoring trends, disease burden and clinical presentation. Local public health agencies can use the information to help communities target their prevention and control activities to protect racial, ethnic, age, or geographic groups who may have a higher risk of illness.

Prevention: In the absence of a vaccine, prevention of WNV disease depends on community-level mosquito control programs to reduce vector densities (which may have limited or no funding), personal protective measures to decrease exposure to infected mosquitoes, and screening of blood and organ donors. Personal protective measures include use of mosquito repellents, wearing long-sleeved shirts and long pants, and limiting outdoor exposure from dusk to dawn. Using air conditioning, installing window and door screens, and reducing peridomestic mosquito breeding sites, can further decrease the risk for WNV exposure.

Blood and some organ donations in the U.S. are screened for WNV infection; health care professionals should remain vigilant for the possible transmission of WNV through blood transfusion or organ transplantation. Any suspected WNV infections temporally associated with blood transfusion or organ transplantation should be reported promptly to the appropriate local or state health department.

Section A - Communicable Disease Surveillance

West Nile Virus Neuroinvasive Disease-continued

During an outbreak of WNV disease, prevention activities are directed at minimizing WNV human morbidity and mortality and should focus on mosquito bite prevention through the use of effective insect repellents and mosquito control. Municipal governments should not wait for identification of a human case to begin mosquito control activities. Areas to prioritize for treatment include:

- Locations already recognized as chronic mosquito breeding grounds.
- Locations of increased mosquito activity identified by citizens' complaints.
- Neighborhoods where residents' lifestyles and habits create increased exposure to biting mosquitoes, such as camps of homeless people, popular evening refuges from the heat (e.g., shaded parks), and areas of depressed housing quality where windows and doors are not adequately screened.
- Determining whether a public health emergency exists is best left to local governments, in consultation with their city or county public health agency or vector control program. All local governments should respond as resources allow, without regard to considerations of whether state- or national-level resources might ultimately become available.

For additional information regarding the prevention of WNV disease visit: http://www.cdc.gov/westnile/prevention/index.html.

Additional Website Resources:

CDC Health Topics

CDIRM

Glossary

Abiotic - pertaining to or characterized by absence of life; incapable of living.

Agent (of Disease) - A factor (e.g. virus, bacterium , parasite, chemical, or radiation) whose presence, excessive presence, or absence of, is essential for the occurrence of disease.

Anamnestic Response - refers to the immune response of the body to a pathogen it recognizes and produces antibodies specifically against that invading substance.

Bioterrorism - The intentional use of chemical, biological, or radiological agents as weapons during acts of violence or intimidation.

Biotic - pertaining to or characterized by life or specific life conditions.

Case - A person or animal identified as having a particular disease.

Confirmed Case - surveillance definition, a case usually with positive laboratory results for the disease, generally associated with signs and symptoms of the disease.

Probable Case - surveillance definition, a case usually with a clinically compatible illness that is epidemiologically linked to a confirmed case.

CD - communicable disease or infectious disease; diseases caused by biological agents such as a virus, bacterium or parasite.

CDC - Centers for Disease Control and Prevention.

CDIRM - Communicable Disease Investigation Reference Manual; Missouri Department of Health and Senior Services.

Cluster - a group of individuals who manifest the same or similar signs and symptoms of disease.

Communicable - Able to spread disease from one person or species to another, either directly or indirectly; contagious.

Disseminated intravascular coagulopathy - bleeding into the skin.

ELC - Epi Laboratory Capacity Grant.

Endemic - Amount or severity of a disease or infectious agent within a given geographic area or population group.

Epidemiology - The study of how and why diseases and other conditions are distributed within the population the way they are.

Epidemiologist - An investigator who studies the occurrence of disease or other health-related conditions or events in defined populations.

Extended (TB) Contact Investigation - when large numbers of people have been exposed to an infectious TB disease case. A contact investigation identifies, examines and evaluates persons who are at risk of infection with *M. tuberculosis* due to a recent exposure. It is a method of new case finding and allows for early treatment of disease, and early detection and treatment of a new infection.

Fecal-oral - The transmission of an infectious agent by ingestion of feces.

Five-year Median - A data set which includes five consecutive year data totals where half of the elements have a larger value and half of the elements have a lesser value. The median can be thought of as the "middle" of the data.

Glossary

Hospitalized and deaths[¥] **-** It is unknown whether the disease or condition discussed in this report was directly attributable to the person's hospitalization and/or death. The disease or condition may have been incidental, occurring merely in the presence of the person's hospitalization and/or death.

Incidence - The number of new cases of a disease occurring in a population during a defined time period.

Incidence Rate - The rate at which new events occur in a population. For examples of the calculations, see page 55.

Incubation period - The time between exposure to an infectious agent and appearance of the first sign or symptom of the disease.

Leukopenia - Abnormal decrease of white blood cells usually below 5000/mm^3.

Malaise - A subjective sense of discomfort, weakness, fatigue, or feeling rundown that may occur alone or accompany other symptoms and illnesses.

Mean - Commonly called average, is defined as the sum of the observations divided by the number of observations. For examples of the calculations, see page 55.

Median - The point in a data set where half of the elements have a larger value and half of the elements have a lesser value. The median can be thought of as the "middle" of the data. For examples of the calculations, see page 55.

Morbidity - Having disease, or the proportion of persons in a community with the disease.

Mortality - Refers to death.

Myalgia - Tenderness or pain in the muscles; muscular rheumatism.

National IR - 2011[§] - The 2011 national incidence rates (IR) were used for most diseases/conditions contained in this report [the 2012 national IRs had not been published when this report was originally written].

Neonate - a newborn infant up to one month of age.

Outbreak (or epidemic) - the occurrence in a community or region of an illness(es) similar in nature, clearly in excess of normal expectancy and derived from a common or a propagated source.

Pandemic - An outbreak occurring over a wide geographic area; widespread.

Pathogen - An organism capable of causing disease.

Pathogenic - Capable of causing disease.

PCR - Polymerase Chain Reaction. A laboratory procedure used to identify pathogens through amplification of genetic material.

PFGE - Pulse Field Gel Electrophoresis. A laboratory procedure of bacterial strain typing.

Polysaccharide capsule - A protective covering made out of sugar molecules that surrounds some bacteria.

Glossary

Pulse-temperature dissociation - Pulse slower than normal for fever degree (pulse fails to increase with fever spike).

Prevalence - The total number of cases of a disease existing in a given area at any given time.

Preventable TB case:

- A person with a positive TB skin test or TB blood test who is a candidate for treatment and not offered treatment;
- A person with a risk factor(s) for TB who is never offered a TB skin test or TB blood test; and/or
- A secondary TB disease case to a preventable case.

Quartile - Any of three values which divide the sorted data set into four equal parts, so that each part represents 1/4 of the sample or population.

Reactive arthritis - Reactive arthritis is a painful form of inflammatory arthritis that develops in reaction to an infection by bacteria.

Recreational Water - Swimming pools, hot tubs, water parks, water play areas, interactive fountains, lakes, rivers, creeks or oceans.

Rhabdomyolysis - is the breakdown of muscle tissue that leads to the release of muscle fiber contents into the blood. These substances are harmful to the kidney and often cause kidney damage.

Risk Factors - The presence of any particular factor known to be associated with health related conditions considered important to prevent.

Sequela - A condition following and resulting from a disease.

Serotype - To distinguish organisms on the basis of their constituent antigen(s).

Surveillance (of disease) - An ongoing mechanism to collect, analyze, interpret and distribute information.

Trend - Shows movement consistently in the same direction over a long time.

Thrombocytopenia - An abnormal decrease in the number of platelets.

Vaccine - A suspension of attenuated live or killed microorganisms or fractions thereof, administered to induce immunity and thereby prevent infectious disease.

Vector - A carrier, usually an insect or other arthropod.

Statistical Calculations

Examples of Calculations

Mean

Calculate the **mean** by adding all of the values and dividing the sum by the number of observed values (in this case 11).

55 + 12 + 60 + 46 + 85 + 27 + 39 + 94 + 73 + 5 + 60 = **556**

556 / 11 = **50.54545455**

The **mean** for this data set is **50.5** (result is rounded).

Median

The **median** is the element that falls in the middle of the ordered set. Rank the values from least to most:

39, 60, 73, 85, 55, 27, 12, 94, 60, 46, 5

In this example the **median** is the sixth element in the set, which is **55**.

5, 12, 27, 39, 46, **55**, 60, 60, 73, 85, 94

Incidence rates are calculated with the following equation:

(X divided by Y) multiplied by K

Where:
X is the number of cases for a specified time period
Y is the population (possibly exposed) for the same time period
K is a constant (often 1000 or 100,000) that transforms the result into a uniform quantity allowing comparison with other similar quantities.

Example: The Southwest Region has 86 cases of Hepatitis A in 1993, compared to 63 cases in the Central Region for that year. The 1993 population for the Southwest Region is 694,712, while the population for the Central Region is 621,740.

Southwest Region: **(86 / 694,712) * 100,000 = 12.4**
Central Region: **(63 / 621,740) * 100,000 = 10.1**

A comparison of the two incidence rates shows that in 1993 Southwest Region has a slightly higher incidence of Hepatitis A (12.4 reported cases per 100,000 population) than the Central Region (10.1 reported cases per 100,000 population).

Summary Tables

Reported Acute Gastrointestinal Illness
Comparative Statistics by Socio-demographic Category, Missouri 2012[1]

Socio-demographic		Case Count	Percent of Total	Rate per 100,000	5-Year Median	Percent Change from Median
Sex	Female	1,363	51.1%	44.5	1,703	-20%
	Male	1,300	48.8%	44.2	1,701	-23.6%
	Unknown	3	0.1%	N/A	N/A	N/A
Race	Black	196	7.4%	26.5	619	-68.3%
	Other	67	2.5%	41.8	71	-5.6%
	Unknown	488	18.3%	N/A	N/A	N/A
	White	1,915	71.8%	37.5	1,967	-2.6%
Age Group	00 to <01	107	4%	140.7	148	-27.7%
	01 to 04	389	14.6%	126.2	814	-52.2%
	05 to 14	343	12.9%	43.7	663	-48.3%
	15 to 24	313	11.7%	37.5	341	-8.2%
	25 to 39	481	18%	42.1	517	-7%
	40 to 64	685	25.7%	34.1	718	-4.6%
	65 and older	338	12.7%	39.5	294	15%
	Unknown	10	0.4%	N/A	N/A	N/A
District	Central	366	13.7%	54.7	326	12.3%
	Eastern	910	34.1%	40.7	1,376	-33.9%
	Northwest	581	21.8%	36.9	713	-18.5%
	Southeast	338	12.7%	71.1	300	12.7%
	Southwest	471	17.7%	44.6	624	-24.5%
	State of Missouri	2,666	100%	44.4	3,405	-21.7%

[1]Socio-demographic Category Information is missing for some cases. N/A=No computation made.
Data Source: Missouri Health Information Surveillance System (WebSurv).

Summary Tables

Select Reportable Disease Case Counts and Rates
Per 100,000 Population by Health Districts, Missouri 2012

Disease and/or Condition	Central		Eastern		Northwest		Southeast		Southwest		State of Missouri	
	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000
Campylobacteriosis	77	11.5	221	9.9	79	5.0	100	21.0	90	8.5	567	9.4
Creutzfeldt-Jakob Disease (CJD)	1	0.1	2	0.1	3	0.2	0	0.0	2	0.2	8	0.1
Cryptosporidiosis	27	4.0	67	3.0	82	5.2	14	2.9	49	4.6	239	4.0
Cyclosporiasis	0	0.0	0	0.0	2	0.1	0	0.0	0	0.0	2	0.0
Dengue Fever	0	0.0	2	0.1	2	0.1	1	0.2	1	0.1	6	0.1
E. Coli Shiga Toxin Positive	23	3.4	53	2.4	25	1.6	12	2.5	37	3.5	150	2.5
E. Coli (All)	68	10.2	104	4.7	46	2.9	20	4.2	70	6.6	308	5.1
E. Coli O157 H7	45	6.7	51	2.3	21	1.3	8	1.7	33	3.1	158	2.6
Ehrlichiosis & Anaplasmosis (All)	41	6.1	62	2.8	40	2.5	32	6.7	53	5.0	228	3.8
Encephalitis Primary	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	1	0.0
Giardiasis	33	4.9	135	6.0	85	5.4	20	4.2	57	5.4	330	5.5
Haemophilus Influenzae, Invasive	7	1.0	32	1.4	30	1.9	2	0.4	11	1.0	82	1.4
Hansen's Disease (Leprosy)	0	0.0	0	0.0	1	0.1	0	0.0	2	0.2	3	0.0
Hemolytic Uremic Syndrome	7	1.0	2	0.1	0	0.0	2	0.4	7	0.7	18	0.3
Hepatitis A, Acute	1	0.1	6	0.3	9	0.6	1	0.2	4	0.4	21	0.3
Hepatitis B, (Infant) Perinatal	0	0.0	0	0.0	1	0.1	0	0.0	0	0.0	1	0.0
Hepatitis B, Acute	3	0.4	10	0.4	10	0.6	8	1.7	17	1.6	48	0.8
Hepatitis B, Chronic Infection	43	6.4	164	7.3	72	4.6	29	6.1	42	4.0	350	5.8
Hepatitis C, Acute	1	0.1	0	0.0	2	0.1	1	0.2	0	0.0	4	0.1
Hepatitis C, Chronic Infection	432	64.6	1,807	80.8	953	60.5	523	110.0	1,007	95.3	4,722	78.6
Hepatitis E, Acute	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	1	0.0
Hepatitis Other Or Unspecified	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	1	0.0
Influenza Death <18 years of age	0	0.0	0	0.0	0	0.0	0	0.0	1	0.1	1	0.0
Legionellosis	8	1.2	32	1.4	18	1.1	1	0.2	10	0.9	69	1.1
Listeriosis	0	0.0	3	0.1	3	0.2	0	0.0	2	0.2	8	0.1
Lyme	0	0.0	2	0.1	0	0.0	0	0.0	0	0.0	2	0.0
Malaria	0	0.0	8	0.4	6	0.4	0	0.0	5	0.5	19	0.3
Meningococcal Disease	1	0.1	10	0.4	2	0.1	1	0.2	2	0.2	16	0.3
Mumps	0	0.0	1	0.0	3	0.2	1	0.2	0	0.0	5	0.1
Pertussis	43	6.4	410	18.3	299	19.0	21	4.4	42	4.0	815	13.6
Q Fever (All)	2	0.3	0	0.0	1	0.1	0	0.0	0	0.0	3	0.0
Rabies Animal	3	0.0	8	0.0	3	0.0	10	0.0	4	0.0	28	0.0
Rabies Post Exposure Prophylaxis	59	8.8	141	6.3	33	2.1	40	8.4	97	9.2	370	6.2
Rocky Mountain Spotted Fever	48	7.2	51	2.3	41	2.6	82	17.2	93	8.8	315	5.2
Salmonellosis	146	21.8	340	15.2	245	15.6	177	37.2	163	15.4	1,071	17.8
Shigellosis	2	0.3	14	0.6	27	1.7	2	0.4	26	2.5	71	1.2
Strep Disease, Group A Invasive	15	2.2	50	2.2	26	1.7	6	1.3	32	3.0	129	2.1
Strep Pneumoniae, Drug-Resistant	4	0.6	23	1.0	32	2.0	26	5.5	35	3.3	120	2.0
Tetanus	0	0.0	0	0.0	0	0.0	1	0.2	0	0.0	1	0.0
Tick-borne Diseases	95	14.2	119	5.3	87	5.5	119	25.0	152	14.4	572	9.5
Tuberculosis	6	0.9	37	1.7	24	1.5	13	2.7	9	0.9	89	1.5
Tularemia	6	0.9	4	0.2	6	0.4	5	1.1	6	0.6	27	0.4
Typhoid Fever	0	0.0	3	0.1	0	0.0	0	0.0	0	0.0	3	0.0
Varicella (Chickenpox)	143	21.4	47	2.1	111	7.1	12	2.5	75	7.1	388	6.5
Vibriosis	0	0.0	8	0.4	0	0.0	0	0.0	0	0.0	8	0.1
West Nile Fever	0	0.0	2	0.1	0	0.0	1	0.2	0	0.0	3	0.0
West Nile Virus Neuroinvasive Disease	2	0.3	8	0.4	5	0.3	2	0.4	1	0.1	18	0.3
Yersiniosis	3	0.4	9	0.4	0	0.0	0	0.0	1	0.1	13	0.2

Data Source: Missouri Health Information Surveillance System (WebSurv).

Summary Tables

Select Reportable Disease Case Counts and Rates
Per 100,000 Population by Select Age Groups, Missouri 2012

Disease and/or Condition	00 to <01		01 to 04		05 to 14		15 to 24		25 to 39		40 to 64		65 and older		Unknown		Total	
	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000
Campylobacteriosis	15	19.7	57	18.5	59	7.5	85	10.2	112	9.8	175	8.7	62	7.3	2	N/A	567	9.4
Creutzfeldt-Jakob Disease (CJD)	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	3	0.1	5	0.6	0	N/A	8	0.1
Cryptosporidiosis	3	3.9	26	8.4	23	2.9	37	4.4	52	4.6	66	3.3	30	3.5	2	N/A	239	4.0
Cyclosporiasis	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1	0	0.0	0	N/A	2	0.0
Dengue Fever	0	0.0	0	0.0	0	0.0	3	0.4	2	0.2	1	0.0	0	0.0	0	N/A	6	0.1
E. Coli Shiga Toxin Positive	10	13.1	33	10.7	20	2.5	25	3.0	22	1.9	26	1.3	14	1.6	0	N/A	150	2.5
E. Coli (All)	11	14.5	75	24.3	49	6.2	39	4.7	48	4.2	51	2.5	35	4.1	0	N/A	308	5.1
E. Coli O157 H7	1	1.3	42	13.6	29	3.7	14	1.7	26	2.3	25	1.2	21	2.5	0	N/A	158	2.6
Ehrlichiosis & Anaplasmosis (All)	0	0.0	2	0.6	7	0.9	14	1.7	32	2.8	100	5.0	73	8.5	0	N/A	228	3.8
Encephalitis Primary	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.1	0	N/A	1	0.0
Giardiasis	0	0.0	64	20.8	42	5.3	39	4.7	81	7.1	75	3.7	27	3.2	2	N/A	330	5.5
Haemophilus Influenzae, Invasive	5	6.6	3	1.0	2	0.3	3	0.4	11	1.0	22	1.1	36	4.2	0	N/A	82	1.4
Hansen's Disease (Leprosy)	0	0.0	0	0.0	0	0.0	1	0.1	2	0.2	0	0.0	0	0.0	0	N/A	3	0.0
Hemolytic Uremic Syndrome	0	0.0	12	3.9	3	0.4	0	0.0	0	0.0	1	0.0	2	0.2	0	N/A	18	0.3
Hepatitis A, Acute	0	0.0	0	0.0	1	0.1	4	0.5	4	0.4	10	0.5	2	0.2	0	N/A	21	0.3
Hepatitis B, (Infant) Perinatal	0	0.0	1	0.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	N/A	1	0.0
Hepatitis B, Acute	0	0.0	0	0.0	0	0.0	2	0.2	20	1.8	22	1.1	4	0.5	0	N/A	48	0.8
Hepatitis B, Chronic Infection	0	0.0	0	0.0	3	0.4	24	2.9	114	10.0	166	8.3	41	4.8	2	N/A	350	5.8
Hepatitis C, Acute	0	0.0	0	0.0	0	0.0	2	0.2	1	0.1	1	0.0	0	0.0	0	N/A	4	0.1
Hepatitis C, Chronic Infection	1	1.3	3	1.0	3	0.4	398	47.7	1,055	92.4	2,967	147.6	289	33.8	6	N/A	4,722	78.6
Hepatitis E, Acute	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.1	0	N/A	1	0.0
Hepatitis Other Or Unspecified	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	0	N/A	1	0.0
Influenza Death <18 years of age	0	0.0	0	0.0	1	0.1	0	0.0	0	0.0	0	0.0	0	0.0	0	N/A	1	0.0
Legionellosis	0	0.0	0	0.0	0	0.0	1	0.1	7	0.6	35	1.7	26	3.0	0	N/A	69	1.1
Listeriosis	1	1.3	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1	5	0.6	0	N/A	8	0.1
Lyme	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	1	0.1	0	N/A	2	0.0
Malaria	0	0.0	1	0.3	2	0.3	6	0.7	7	0.6	3	0.1	0	0.0	0	N/A	19	0.3
Meningococcal Disease	3	3.9	3	1.0	0	0.0	1	0.1	1	0.1	4	0.2	4	0.5	0	N/A	16	0.3
Mumps	0	0.0	2	0.6	0	0.0	1	0.1	1	0.1	0	0.0	1	0.1	0	N/A	5	0.1
Pertussis	96	126.2	120	38.9	364	46.3	88	10.5	58	5.1	70	3.5	17	2.0	2	N/A	815	13.6
Q Fever (All)	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1	1	0.1	0	N/A	3	0.0
Rabies Post Exposure Prophylaxis	4	5.3	17	5.5	62	7.9	55	6.6	76	6.7	115	5.7	33	3.9	8	N/A	370	6.2
Rocky Mountain Spotted Fever	1	1.3	2	0.6	20	2.5	29	3.5	63	5.5	123	6.1	76	8.9	1	N/A	315	5.2
Salmonellosis	73	96.0	135	43.8	138	17.6	104	12.5	166	14.5	286	14.2	165	19.3	4	N/A	1,071	17.8
Shigellosis	1	1.3	13	4.2	23	2.9	3	0.4	14	1.2	13	0.6	4	0.5	0	N/A	71	1.2
Strep Disease, Group A Invasive	2	2.6	6	1.9	6	0.8	4	0.5	13	1.1	49	2.4	49	5.7	0	N/A	129	2.1
Strep Pneumoniae, Drug-Resistant	2	2.6	1	0.3	6	0.8	1	0.1	7	0.6	52	2.6	51	6.0	0	N/A	120	2.0
Tetanus	0	0.0	0	0.0	0	0.0	0	0.0	1	0.1	0	0.0	0	0.0	0	N/A	1	0.0
Tick-borne Diseases	1	1.3	7	2.3	31	3.9	45	5.4	97	8.5	233	11.6	157	18.4	1	N/A	572	9.5
Tuberculosis	2	2.6	1	0.3	1	0.1	7	0.8	17	1.5	33	1.6	28	3.3	0	N/A	89	1.5
Tularemia	0	0.0	3	1.0	4	0.5	2	0.2	2	0.2	9	0.4	7	0.8	0	N/A	27	0.4
Typhoid Fever	0	0.0	1	0.3	0	0.0	1	0.1	1	0.1	0	0.0	0	0.0	0	N/A	3	0.0
Varicella (Chickenpox)	11	14.5	82	26.6	231	29.4	34	4.1	14	1.2	13	0.6	3	0.4	0	N/A	388	6.5
Vibriosis	0	0.0	0	0.0	2	0.3	0	0.0	1	0.1	4	0.2	1	0.1	0	N/A	8	0.1
West Nile Fever	0	0.0	0	0.0	1	0.1	0	0.0	0	0.0	2	0.1	0	0.0	0	N/A	3	0.0
West Nile Virus Neuroinvasive Disease	0	0.0	0	0.0	0	0.0	0	0.0	2	0.2	8	0.4	8	0.9	0	N/A	18	0.3
Yersiniosis	2	2.6	3	1.0	3	0.4	0	0.0	0	0.0	0	0.0	5	0.6	0	N/A	13	0.2

N/A=No computation made. Data Source: Missouri Health Information Surveillance System (WebSurv).

Summary Tables

Select Reportable Disease / Condition Case Counts by County, Including the Cities of Independence, Joplin, Kansas City & St. Louis City, Missouri 2012

County / City	Animal Bites	Botulism Infant	Brucellosis	Campylobacteriosis	Creutzfeldt-Jakob Disease (CJD)	Cryptosporidiosis	Cyclosporiasis	Dengue Fever	E. Coli Shiga Toxin Positive	E. Coli (All)	E. Coli O157 H7	Ehrlichiosis & Anaplasmosis (All)	Encephalitis P. Other	Giardiasis	Haemophilus Influenzae, Invasive	Hansen's Disease (Leprosy)	Hemolytic Uremic Syndrome	Hepatitis A Acute	Hepatitis B (Infant) Perinatal	Hepatitis B Acute	Hepatitis B Chronic Infection	Hepatitis C Acute	Hepatitis C, Chronic Infection	Hepatitis E Acute	Hepatitis Other Or Unspecified	Influenza Death < 18 Years	Legionellosis	Listeriosis	Lyme	Malaria	Meningococcal Disease	Mumps	Pertussis	Q Fever,Acute	Q Fever,Chronic	Rabies Animal	Rabies Post Exposure Prophylaxis	Rocky Mountain Spotted Fever	Salmonellosis	Shigellosis	Strep Disease, Group A Invasive	Strep Pneumoniae, Drug-Resistant	Tetanus	Tick-borne Diseases	Tuberculosis	Tularemia	Typhoid Fever	Varicella (Chickenpox)	Vibriosis	West Nile Fever	West Nile Virus Neuroinvasive Disease	Yersiniosis
Adair	9	0	0	2	1	1	0	0	0	1	1	1	0	3	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	2	0	0	0	0	3	0	0	0	1	0	0	0	0
Andrew	0	0	0	1	0	2	0	0	1	2	1	1	0	0	1	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	5	0	0	0	0	1	0	0	0	2	0	0	0	0
Audrain	5	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	3	0	19	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Barry	6	0	0	7	1	1	0	0	3	7	4	0	0	3	0	0	1	1	0	0	1	0	23	0	0	0	0	0	0	0	0	0	0	0	0	0	6	2	6	3	3	0	0	2	0	0	0	3	0	0	0	0
Barton	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	1	0	0	0	1	1	3	0	0	0	0	2	0	0	0	2	0	0	0	0
Bates	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	4	0	0	1	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Benton	23	0	0	0	0	2	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	4	1	0	0	0	16	0	1	0	0	0	0	0	0
Bollinger	7	0	0	4	0	1	0	0	1	1	0	3	0	2	0	0	0	0	0	0	2	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4	3	0	0	1	0	7	1	0	0	0	0	0	0	0
Boone	39	0	0	26	0	9	0	0	7	20	13	4	0	13	3	0	3	0	0	1	19	0	#	0	0	0	2	0	0	0	0	0	16	1	0	2	15	4	40	1	2	1	0	10	4	2	0	5	0	0	0	1
Buchanan	1	0	0	1	2	12	0	0	2	3	1	0	0	6	4	0	0	0	0	3	10	0	76	0	0	0	0	0	0	1	0	0	3	0	0	0	0	0	9	0	0	5	0	0	2	0	0	8	0	0	0	0
Butler	2	0	0	6	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	4	5	0	91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	34	1	0	0	0	20	1	1	0	0	0	0	0	0
Caldwell	2	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0
Callaway	11	0	0	5	0	0	0	0	0	1	1	1	0	1	2	0	0	0	0	0	4	0	16	0	0	0	1	0	0	0	0	0	8	0	0	0	7	4	10	1	2	1	0	5	0	0	0	1	0	0	0	1
Camden	11	0	0	9	0	1	0	0	1	4	3	8	0	5	0	0	0	0	0	1	4	0	34	0	0	0	1	0	0	0	0	0	2	0	0	0	9	6	3	0	1	0	0	14	0	0	0	93	0	0	0	0
Cape Girardeau	5	0	0	26	0	8	0	1	8	14	6	4	0	0	0	0	1	1	0	0	6	1	47	0	0	0	1	0	0	0	1	0	3	0	0	0	3	3	22	1	1	6	1	7	0	0	0	1	0	0	0	0
Carroll	0	0	0	1	0	0	0	0	2	2	0	0	0	1	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	0	0	1	0
Carter	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Cass	1	0	0	4	0	4	0	0	2	4	2	1	0	4	0	0	0	0	0	0	2	0	38	0	0	0	0	0	0	0	1	0	16	0	0	0	1	1	18	1	4	3	0	2	0	0	0	11	0	0	0	0
Cedar	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	2	0	0	0	0	0	0	0	0
Chariton	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	1	0	5	0	0	0	0
Christian	12	0	0	2	0	5	0	1	3	8	5	2	0	4	0	0	2	0	0	3	3	0	39	0	0	0	1	0	0	0	0	0	0	0	0	0	13	5	11	0	3	4	0	7	1	0	0	10	0	0	0	0
Clark	1	0	0	1	0	1	0	0	0	2	2	0	0	1	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	0	0	0	1	0	0	0	0	0	0	0	0
Clay	6	0	0	8	0	4	0	0	1	3	2	5	0	11	2	0	0	0	0	2	3	0	38	0	0	0	0	1	0	1	1	0	24	0	0	1	0	2	19	9	2	4	0	7	0	0	0	29	0	0	0	0
Clinton	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	12	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	10	0	0	0	0	1	0	0	0	2	0	0	0	0
Cole	9	0	0	2	0	1	0	0	1	3	2	5	0	1	1	0	1	0	0	0	2	1	55	0	0	0	0	0	0	0	1	0	7	0	0	0	3	3	23	0	0	0	0	9	0	1	0	1	0	0	0	1
Cooper	4	0	0	1	0	0	0	0	1	10	9	1	0	1	0	0	1	0	0	0	1	0	15	0	0	0	0	0	0	0	0	0	1	0	0	0	3	4	6	0	0	1	0	5	1	0	0	1	0	0	0	0
Crawford	2	0	0	2	0	3	0	0	1	1	0	2	0	1	1	0	0	0	0	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	1	3	1	2	0	2	0	0	3	1	0	0	1	0	0	0	0
Dade	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Dallas	2	0	0	1	0	0	0	0	1	2	1	5	0	2	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	1	0	5	0	0	0	4	0	0	0	0
Daviess	3	0	0	1	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	3	0	0	0	0	0	0	0	0
Dekalb	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6	0	0	1	0	1	0	0	0	0	0	0	0	0
Dent	1	0	0	4	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	3	0	0	0	0	6	0	0	0	0	0	0	0	1
Douglas	4	0	0	2	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	13	0	0	0	0	0	0	0	0	0	0	0	0	2	3	4	0	0	1	2	0	5	0	0	0	3	0	0	0	0
Dunklin	0	0	0	3	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	20	0	0	0	0	2	0	0	0	0	0	0	1	0
Franklin	3	0	0	9	0	3	0	0	2	5	3	0	0	2	0	0	0	1	0	0	1	0	62	0	0	0	1	0	1	0	0	0	5	0	0	1	6	3	18	0	1	0	0	4	2	0	0	6	0	0	0	0
Gasconade	3	0	0	2	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	4	0	0	0	0	3	0	0	0	0	0	0	0	0
Gentry	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Greene	31	0	0	20	1	15	0	0	11	21	10	12	0	12	3	0	2	0	0	8	13	0	#	0	0	0	2	1	0	3	0	0	17	0	0	0	32	8	38	11	13	16	0	21	1	1	0	5	0	0	0	0
Grundy	24	0	0	5	0	2	0	0	1	1	0	1	0	5	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	2	0	0	0	1	0	0	0	0
Harrison	3	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	1	0	0	0	1	0	0	0	0
Henry	3	0	0	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	6	0	0	0	0	7	0	1	0	3	0	0	0	0
Hickory	1	0	0	1	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Holt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Howard	2	0	0	1	0	2	0	0	0	4	4	0	0	1	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	2	0	0	0	0	3	0	0	0	1	0	0	0	0
Howell	9	0	0	5	0	3	0	0	1	1	0	6	0	2	0	0	0	0	0	0	4	0	56	0	0	0	0	0	0	0	0	0	3	0	0	6	13	5	5	0	0	4	0	14	2	3	0	2	0	0	0	0
Independence	2	0	0	6	0	7	0	0	1	2	1	2	0	4	4	1	0	0	0	1	7	0	79	0	0	0	4	1	0	0	0	0	39	0	0	0	0	2	10	1	7	4	0	5	0	1	0	22	0	0	0	0
Iron	7	0	0	2	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	1	0	16	0	0	0	0	0	0	0	0	0	5	0	0	0	1	2	4	0	0	1	0	3	0	0	0	0	0	0	0	0
Jackson	5	0	0	3	1	7	1	0	4	5	1	5	0	13	4	0	0	1	0	1	10	2	81	0	0	0	4	0	0	0	0	2	74	0	0	0	8	8	25	4	4	8	0	14	5	1	0	10	0	0	0	0
Jasper	7	0	0	4	0	4	0	0	6	8	2	6	0	2	0	0	0	0	0	0	4	0	26	0	0	0	3	0	0	0	0	0	12	0	0	0	4	8	20	1	3	1	0	14	0	0	0	17	0	0	0	0
Jefferson	26	0	0	15	0	3	0	0	7	11	4	15	0	5	2	0	1	1	0	1	5	0	#	0	0	0	3	0	0	0	0	0	31	0	0	0	14	15	35	1	3	2	0	30	0	0	0	6	0	0	0	0
Johnson	9	0	0	8	0	2	0	0	2	3	1	4	0	0	1	0	0	1	0	0	2	0	16	0	0	0	0	0	0	0	0	0	5	0	0	0	0	3	12	0	0	0	0	7	1	0	0	5	0	0	0	0
Joplin	23	0	0	1	0	5	0	0	0	0	0	2	0	1	0	0	0	1	0	0	3	0	86	0	0	0	0	0	0	0	0	0	2	0	0	0	0	4	6	7	0	0	0	7	4	1	0	2	0	0	0	0
Kansas City	0	0	0	17	0	29	0	2	3	8	5	6	0	32	10	0	0	2	0	1	27	0	#	0	0	0	7	1	0	3	0	0	#	0	0	1	24	5	71	10	7	6	0	11	15	0	0	3	0	0	3	0
Knox	2	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0
Laclede	1	0	0	7	0	1	0	0	3	5	2	4	0	0	0	0	0	0	0	0	1	0	38	0	0	0	0	0	0	0	1	0	0	0	0	1	1	8	4	0	4	0	0	12	0	0	0	14	0	0	1	0
Lafayette	1	0	0	1	0	0	0	0	1	2	1	0	0	1	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	2	0	0	1	0
Lawrence	18	0	0	7	0	5	0	0	1	2	1	2	0	0	0	0	0	1	0	3	3	0	37	0	0	0	0	1	0	0	0	0	0	0	0	0	5	4	7	0	1	4	0	6	1	0	0	2	0	0	0	0
Lewis	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	5	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0
Lincoln	1	0	0	12	0	0	0	0	2	5	3	0	0	3	1	0	0	0	0	0	0	0	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	12	0	5	0	0	1	0	0	0	1	0	0	0	0
Linn	4	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	0	0	0	0	0	0	2	0	0	0	0
Livingston	6	0	0	1	0	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0	2	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	1	0	2	0	0	0	0
Macon	2	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	1	0	0	1	2	1	2	0	2	0	0	5	0	1	0	2	0	0	0	0
Madison	4	0	0	0	0	0	0	0	0	1	1	2	0	1	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	6	0	0	0	0	2	0	0	0	0	0	0	0	0
Maries	1	0	0	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2	2	0	0	0	0	3	0	0	0	0	0	0	0	0
Marion	1	0	0	6	0	0	0	0	0	3	3	1	0	0	0	0	0	0	0	0	1	0	26	0	0	0	1	0	0	0	0	0	1	1	0	0	0	3	5	0	1	0	0	4	1	0	0	3	0	0	0	0
McDonald	4	0	0	9	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	4	11	4	1	0	2	0	11	0	0	0	0	0	0	0	0
Mercer	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0
Miller	4	0	0	0	0	2	0	0	4	5	1	3	0	1	0	0	0	0	0	0	3	0	13	0	0	0	0	0	0	0	0	0	1	0	0	0	3	2	8	0	1	0	0	5	0	0	0	6	0	0	0	0
Mississippi	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0
Moniteau	0	0	0	5	0	1	0	0	3	3	0	2	0	1	1	0	0	1	0	0	2	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	4	0	0	0	0	3	0	0	0	0	0	0	0	0
Monroe	3	0	0	2	0	0	0	0	1	3	2	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	18	0	0	0	0
Montgomery	6	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	0	0	1	0	2	0	0	0	1	0	0	0	0
Morgan	2	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	1	0	0	3	0	0	0	3	0	0	0	0
New Madrid	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	1	0	0	0	0	0	0	0	0	0	0
Newton	6	0	0	2	0	3	0	0	2	2	0	6	0	6	0	2	1	1	0	0	1	0	20	0	0	0	0	0	0	0	1	0	2	0	0	0	4	13	6	2	0	1	0	20	1	1	0	0	0	0	0	0
Nodaway	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	7	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0
Oregon	9	0	0	4	0	0	0	0	0	0	0	5	0	4	0	0	0	0	0	0	1	0	5	0	0	0	0	0	0	0	0	0	2	0	0	0	5	6	5	0	2	0	0	11	0	0	0	0	0	0	0	0
Osage	1	0	0	0	0	0	0	0	2	2	0	1	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	1	0	0	2	0	1	0	0	0	0	0	0
Ozark	1	0	0	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	3	0	0	2	0	14	0	0	0	0	0	0	0	0
Pemiscot	2	0	0	1	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	0	1	0	39	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	1	0	0	3	0	0	0	0	0	0	0
Perry	0	0	0	2	0	0	0	0	0	2	2	2	0	3	0	0	1	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	0	0	2	0	0	0	0	0	0	0	0
Pettis	13	0	0	6	0	2	0	0	1	1	0	1	0	3	2	0	0	0	1	1	2	0	23	0	0	0	0	0	0	0	0	0	5	0	0	0	0	1	9	0	0	0	0	2	0	0	0	5	0	0	0	0
Phelps	11	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	2	0	75	0	0	1	0	0	0	0	0	0	1	0	0	0	6	5	10	0	1	0	0	5	0	0	0	5	0	0	0	0
Pike	4	0	0	6	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0	2	0	12	0	0	0	0	0	0	0	1	0	5	0	0	0	1	6	7	0	1	0	0	8	0	0	0	13	0	0	0	0
Platte	0	0	0	2	0	2	1	0	1	2	1	1	0	2	0	0	0	0	0	0	1	0	17	0	0	0	1	0	0	0	0	0	4	0	0	0	0	1	7	0	0	0	0	3	1	1	0	3	0	0	0	0
Polk	7	0	0	5	0	1	0	0	0	2	2	0	0	1	0	0	1	0	0	1	4	0	36	0	0	0	1	0	0	1	0	0	4	0	0	0	3	2	4	0	0	1	0	3	0	1	0	2	0	0	0	0
Pulaski	4	0	0	1	0	0	0	0	1	2	1	0	0	4	0	0	0	0	0	0	2	0	28	0	0	0	1	0	0	1	0	0	0	0	0	0	2	0	9	0	0	0	0	0	0	0	0	1	0	0	0	0
Putnam	4	0	0	8	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	1	0	0	0	0	3	0	0	0	0	0	0	0	0
Ralls	1	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	5	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Randolph	5	0	0	2	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	11	0	2	0	0	4	0	0	0	0	0	0	1	0
Ray	0	0	0	1	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	1	0	6	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0
Reynolds	3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	0	0	0	0	0	4	0	0	0	2	0	0	0	0
Ripley	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	0	0	0	0	1	0	0	0	0	0	0	0	0
Saline	0	0	0	7	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	7	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	7	0	2	0	0	1	0	0	0	1	0	0	0	0
Schuyler	2	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Scotland	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0
Scott	0	0	0	23	0	1	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	17	0	1	4	0	1	5	0	0	2	0	0	0	0
Shannon	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	1	0	0	0	0	3	0	0	0	0	0	1	0	0
Shelby	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	2	0	0	0	0	0	0	0	0
St Charles	14	0	0	45	0	12	0	1	11	27	16	5	0	12	6	0	0	0	0	3	15	0	#	0	0	0	5	0	0	0	2	0	60	0	0	0	16	7	40	4	6	6	0	14	4	2	1	3	1	1	0	1
St Clair	5	0	0	0	0	0	0	0	0	1	1	1	0	1	1	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	4	1	0	0	0	1	0	0	0	2	0	0	0	0
St Francois	29	0	0	11	0	4	0	0	3	5	2	5	0	6	0	0	0	0	0	1	6	0	#	1	0	0	0	0	0	1	1	0	8	0	0	0	14	1	15	0	0	0	0	6	0	0	0	0	0	0	0	0
St Louis	#	0	0	98	2	38	0	0	18	33	15	22	0	42	14	0	0	3	0	4	82	0	#	0	0	0	16	3	1	6	5	0	#	0	0	6	86	16	152	8	22	6	0	40	20	1	2	11	6	1	2	4
St Louis City	1	0	1	17	0	5	0	1	8	12	4	5	1	56	7	0	0	1	0	1	52	0	#	0	1	0	6	0	0	1	1	1	39	0	0	1	0	0	40	1	12	7	0	6	11	1	0	5	0	0	6	4
Ste Genevieve	0	0	0	3	0	2	0	0	1	1	0	3	0	3	1	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	10	0	0	0	0	5	0	0	0	2	1	0	0	0
Stoddard	0	0	0	9	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	3	1	0	32	0	0	0	0	0	0	0	0	0	2	0	0	0	0	9	12	0	0	1	0	10	0	0	0	2	0	0	1	0
Stone	5	0	0	2	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	14	0	0	0	1	0	0	0	0	0	0	0	0	0	3	5	4	0	0	2	0	5	0	0	0	0	0	0	0	0
Sullivan	1	0	0	1	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	1	0	0	2	0	0	0	0	0	0	0	0
Taney	3	1	0	1	0	0	0	0	1	2	1	1	0	3	3	0	0	0	0	0	1	0	57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	4	0	1	1	0	9	0	1	0	0	0	0	0	0
Texas	6	0	0	3	0	1	0	0	0	0	0	3	0	1	1	0	0	0	0	1	2	0	35	0	0	0	0	0	0	0	0	0	2	0	0	0	5	3	10	0	1	2	0	6	0	0	0	0	0	0	0	0
Vernon	0	0	0	8	0	2	0	0	1	3	2	0	0	7	0	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0	1	0	0	0	0
Warren	0	0	0	2	0	0	0	0	0	1	1	2	0	3	0	0	0	0	0	0	0	0	21	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	5	0	0	0	0	2	0	0	0	0	0	0	0	0
Washington	3	0	0	1	0	0	0	0	1	1	0	1	0	0	1	0	0	0	0	0	1	0	31	0	0	0	1	0	0	0	0	0	1	0	0	0	3	0	3	0	0	2	0	1	0	0	0	0	0	0	0	0
Wayne	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	11	0	0	0	0	0	0	0	0	0	2	0	0	0	1	6	9	0	0	0	0	6	1	0	0	0	0	0	0	0
Webster	8	0	0	3	0	2	0	0	3	3	0	4	0	4	0	0	0	0	0	1	1	0	18	0	0	0	0	0	0	0	0	0	1	0	0	1	3	1	8	0	0	1	0	6	0	1	0	4	0	0	0	0
Worth	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Wright	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	25	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	0	0	1	0	1	0	1	0	0	0	0	0	0

Data Source: Missouri Health Information Surveillance System (WebSurv).

Summary Tables

Select Reportable Disease Case Counts By Event Month, Missouri 2012												
Disease and/or Condition	January	February	March	April	May	June	July	August	September	October	November	December
Botulism Infant	0	0	0	0	0	0	0	0	0	0	0	1
Campylobacteriosis	30	38	33	47	63	75	79	50	49	46	33	24
Creutzfeldt-Jakob Disease (CJD)	0	0	0	1	1	0	2	2	0	1	1	0
Cryptosporidiosis	9	9	18	18	27	25	31	24	25	24	10	19
Cyclosporiasis	0	0	0	0	1	0	1	0	0	0	0	0
Dengue Fever	0	0	0	0	0	0	2	2	0	0	0	2
E. Coli Shiga Toxin Positive	13	8	6	22	16	10	20	14	13	16	8	4
E. Coli O157 H7	1	1	1	34	17	12	13	24	23	17	11	4
Ehrlichiosis & Anaplasmosis (All)	0	1	0	13	40	52	63	31	16	9	2	1
Encephalitis P. Other	0	0	0	0	0	0	0	0	0	1	0	0
Giardiasis	27	17	16	16	17	26	39	49	38	36	20	29
Haemophilus Influenzae, Invasive	4	8	7	6	15	2	5	3	8	9	5	10
Hansen's Disease (Leprosy)	0	0	0	0	0	0	2	0	1	0	0	0
Hemolytic Uremic Syndrome	0	1	1	4	1	0	2	1	7	0	0	1
Hepatitis A, Acute	1	5	4	1	2	1	1	2	2	0	1	1
Hepatitis B, (Infant) Perinatal	1	0	0	0	0	0	0	0	0	0	0	0
Hepatitis B, Acute	6	6	4	7	8	2	2	4	3	3	3	0
Hepatitis B, Chronic Infection	42	39	37	23	36	27	31	24	24	20	25	22
Hepatitis C, Acute	0	0	1	2	0	0	0	0	1	0	0	0
Hepatitis C, Chronic Infection	403	445	409	401	420	352	375	390	372	443	369	343
Hepatitis E, Acute	0	0	0	0	0	0	0	0	0	0	1	0
Hepatitis Other Or Unspecified	0	0	0	1	0	0	0	0	0	0	0	0
Influenza Death <18 years of age	0	0	1	0	0	0	0	0	0	0	0	0
Legionellosis	4	2	1	5	9	4	6	6	8	16	6	2
Listeriosis	1	1	0	2	0	0	0	1	0	1	1	1
Lyme	0	0	0	0	0	0	0	0	2	0	0	0
Malaria	2	1	1	1	2	1	2	3	4	0	2	0
Meningococcal Disease	3	0	3	3	0	0	0	2	2	1	1	1
Mumps	0	2	0	0	0	0	0	2	1	0	0	0
Pertussis	72	46	18	42	85	91	116	106	67	56	56	60
Q Fever, Acute	0	0	1	0	0	0	0	0	1	0	0	0
Q Fever, Chronic	0	0	0	0	1	0	0	0	0	0	0	0
Rabies Animal	1	1	4	4	3	4	3	2	4	2	0	0
Rabies Post Exposure Prophylaxis	20	16	20	38	35	49	43	50	37	22	24	16
Rocky Mountain Spotted Fever	1	1	6	29	56	67	69	36	30	14	4	2
Salmonellosis	37	39	42	79	88	125	140	161	133	122	67	38
Shigellosis	11	7	2	7	4	7	12	7	8	3	3	0
Strep Disease, Group A Invasive	13	18	17	14	6	8	10	3	8	9	12	11
Strep Pneumoniae, Drug-Resistant	20	15	13	16	13	7	2	4	4	7	16	3
Tetanus	0	0	0	0	0	1	0	0	0	0	0	0
Tick-borne Diseases	1	2	6	45	100	123	135	69	54	27	7	3
Tuberculosis	2	7	8	6	13	5	5	10	4	11	9	9
Tularemia	0	0	0	3	4	4	3	2	6	4	1	0
Typhoid Fever	0	0	0	1	0	0	1	0	1	0	0	0
Varicella (Chickenpox)	20	21	20	26	23	11	12	33	121	53	31	17
Vibriosis	0	0	0	0	0	4	2	0	0	1	1	0
West Nile Fever & West Nile Virus Neuroinvasive Disease	1	0	0	0	0	0	1	8	9	2	0	0
Yersiniosis	2	1	0	1	0	0	1	2	1	2	0	3

Data Source: Missouri Health Information Surveillance System (WebSurv).

Summary Tables

Select Reportable Disease Case Counts and Rates Per 100,000 Population, By Gender, Missouri 2012

Disease and/or Comdition	Female		Male		Unknown		Total	
	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000
Campylobacteriosis	263	8.6	304	10.3	0	N/A	567	9.4
Creutzfeldt-Jakob Disease (CJD)	2	0.1	5	0.2	1	N/A	8	0.1
Cryptosporidiosis	119	3.9	120	4.1	0	N/A	239	4
Cyclosporiasis	2	0.1	0	0	0	N/A	2	0
Dengue Fever	1	0	5	0.2	0	N/A	6	0.1
E. Coli Shiga Toxin Positive	81	2.6	69	2.3	0	N/A	150	2.5
E. Coli (All)	167	5.4	141	4.8	0	N/A	308	5.1
E. Coli O157 H7	86	2.8	72	2.4	0	N/A	158	2.6
Ehrlichiosis & Anaplasmosis (All)	96	3.1	132	4.5	0	N/A	228	3.8
Encephalitis Primary	1	0	0	0	0	N/A	1	0
Giardiasis	147	4.8	182	6.2	1	N/A	330	5.5
Haemophilus Influenzae, Invasive	43	1.4	39	1.3	0	N/A	82	1.4
Hansen's Disease (Leprosy)	1	0	2	0.1	0	N/A	3	0
Hemolytic Uremic Syndrome	13	0.4	5	0.2	0	N/A	18	0.3
Hepatitis A Acute	15	0.5	6	0.2	0	N/A	21	0.3
Hepatitis B, (Infant) Perinatal	1	0	0	0	0	N/A	1	0
Hepatitis B, Acute	20	0.7	28	1	0	N/A	48	0.8
Hepatitis B, Chronic Infection	155	5.1	195	6.6	0	N/A	350	5.8
Hepatitis C, Acute	1	0	3	0.1	0	N/A	4	0.1
Hepatitis C, Chronic Infection	1,796	58.6	2,923	99.3	3	N/A	4,722	78.6
Hepatitis E, Acute	0	0	1	0	0	N/A	1	0
Hepatitis Other Or Unspecified	1	0	0	0	0	N/A	1	0
Influenza Death <18 years of age	0	0	1	0	0	N/A	1	0
Legionellosis	31	1	38	1.3	0	N/A	69	1.1
Listeriosis	5	0.2	3	0.1	0	N/A	8	0.1
Lyme	1	0	1	0	0	N/A	2	0
Malaria	8	0.3	11	0.4	0	N/A	19	0.3
Meningococcal Disease	11	0.4	5	0.2	0	N/A	16	0.3
Mumps	0	0	5	0.2	0	N/A	5	0.1
Pertussis	468	15.3	347	11.8	0	N/A	815	13.6
Q Fever (All)	0	0	3	0.1	0	N/A	3	0
Rabies Post Exposure Prophylaxis	187	6.1	181	6.1	2	N/A	370	6.2
Rocky Mountain Spotted Fever	96	3.1	219	7.4	0	N/A	315	5.2
Salmonellosis	574	18.7	495	16.8	2	N/A	1,071	17.8
Shigellosis	46	1.5	25	0.8	0	N/A	71	1.2
Strep Disease, Group A Invasive	69	2.3	60	2	0	N/A	129	2.1
Strep Pneumoniae, Drug-Resistant	67	2.2	53	1.8	0	N/A	120	2
Tetanus	0	0	1	0	0	N/A	1	0
Tick-borne Diseases	207	6.8	365	12.4	0	N/A	572	9.5
Tuberculosis	30	1	59	2	0	N/A	89	1.5
Tularemia	14	0.5	13	0.4	0	N/A	27	0.4
Typhoid Fever	1	0	2	0.1	0	N/A	3	0
Varicella (Chickenpox)	181	5.9	207	7	0	N/A	388	6.5
Vibriosis	3	0.1	5	0.2	0	N/A	8	0.1
West Nile Fever	0	0	3	0.1	0	N/A	3	0
West Nile Virus Neuroinvasive Disease	4	0.1	14	0.5	0	N/A	18	0.3
Yersiniosis	7	0.2	6	0.2	0	N/A	13	0.2

N/A=No computation made. Data Source: Missouri Health Information Surveillance System (WebSurv).

Summary Tables

Select Reportable Disease Case Counts and Rates Per 100,000 Population by Race, Missouri 2012

Disease and/or Condition	Black		White		Unknown		Other		Total	
	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000
Campylobacteriosis	24	3.2	443	8.7	88	N/A	12	7.5	567	9.4
Creutzfeldt-Jakob Disease (CJD)	1	0.1	5	0.1	2	N/A	0	0	8	0.1
Cryptosporidiosis	18	2.4	192	3.8	25	N/A	4	2.5	239	4
Cyclosporiasis	0	0	1	0	1	N/A	0	0	2	0
Dengue Fever	0	0	2	0	3	N/A	1	0.6	6	0.1
E. Coli Shiga Toxin Positive	5	0.7	118	2.3	24	N/A	3	1.9	150	2.5
E. Coli (All)	11	1.5	244	4.8	48	N/A	5	3.1	308	5.1
E. Coli O157 H7	6	0.8	126	2.5	24	N/A	2	1.2	158	2.6
Ehrlichiosis & Anaplasmosis (All)	4	0.5	199	3.9	23	N/A	2	1.2	228	3.8
Encephalitis Primary	0	0	1	0	0	N/A	0	0	1	0
Giardiasis	40	5.4	192	3.8	79	N/A	19	11.9	330	5.5
Haemophilus Influenzae, Invasive	14	1.9	49	1	16	N/A	3	1.9	82	1.4
Hansen's Disease (Leprosy)	0	0	0	0	0	N/A	3	1.9	3	0
Hemolytic Uremic Syndrome	0	0	16	0.3	1	N/A	1	0.6	18	0.3
Hepatitis A, Acute	1	0.1	15	0.3	4	N/A	1	0.6	21	0.3
Hepatitis B, (Infant) Perinatal	0	0	1	0	0	N/A	0	0	1	0
Hepatitis B, Acute	4	0.5	29	0.6	13	N/A	2	1.2	48	0.8
Hepatitis B, Chronic Infection	55	7.4	85	1.7	146	N/A	64	40	350	5.8
Hepatitis C, Acute	0	0	4	0.1	0	N/A	0	0	4	0.1
Hepatitis C, Chronic Infection	432	58.3	1,725	33.8	2,537	N/A	28	17.5	4,722	78.6
Hepatitis E, Acute	0	0	1	0	0	N/A	0	0	1	0
Hepatitis Other Or Unspecified	0	0	0	0	1	N/A	0	0	1	0
Influenza Death <18 years of age	0	0	1	0	0	N/A	0	0	1	0
Legionellosis	12	1.6	45	0.9	12	N/A	0	0	69	1.1
Listeriosis	1	0.1	5	0.1	1	N/A	1	0.6	8	0.1
Lyme	0	0	2	0	0	N/A	0	0	2	0
Malaria	7	0.9	7	0.1	3	N/A	2	1.2	19	0.3
Meningococcal Disease	3	0.4	12	0.2	0	N/A	1	0.6	16	0.3
Mumps	1	0.1	4	0.1	0	N/A	0	0	5	0.1
Pertussis	91	12.3	612	12	91	N/A	21	13.1	815	13.6
Q Fever (All)	0	0	3	0.1	0	N/A	0	0	3	0
Rabies Post Exposure Prophylaxis	11	1.5	280	5.5	72	N/A	7	4.4	370	6.2
Rocky Mountain Spotted Fever	2	0.3	281	5.5	29	N/A	3	1.9	315	5.2
Salmonellosis	81	10.9	745	14.6	225	N/A	20	12.5	1,071	17.8
Shigellosis	12	1.6	45	0.9	10	N/A	4	2.5	71	1.2
Strep Disease, Group A Invasive	16	2.2	93	1.8	19	N/A	1	0.6	129	2.1
Strep Pneumoniae, Drug-Resistant	12	1.6	93	1.8	14	N/A	1	0.6	120	2
Tetanus	0	0	1	0	0	N/A	0	0	1	0
Tick-borne Diseases	7	0.9	506	9.9	54	N/A	5	3.1	572	9.5
Tuberculosis	30	4.1	38	0.7	0	N/A	21	13.1	89	1.5
Tularemia	1	0.1	24	0.5	2	N/A	0	0	27	0.4
Typhoid Fever	0	0	2	0	1	N/A	0	0	3	0
Varicella (Chickenpox)	15	2	323	6.3	41	N/A	9	5.6	388	6.5
Vibriosis	0	0	7	0.1	1	N/A	0	0	8	0.1
West Nile Fever	0	0	2	0	0	N/A	1	0.6	3	0
West Nile Virus Neuroinvasive Disease	0	0	12	0.2	5	N/A	1	0.6	18	0.3
Yersiniosis	7	0.9	5	0.1	1	N/A	0	0	13	0.2

N/A=No computation made. Data Source: Missouri Health Information Surveillance System (WebSurv).